NEW HAMPSHIRE

MEDICAL SOCIETY

1894

1791 1894

TRANSACTIONS

OF THE

NEW HAMPSHIRE MEDICAL SOCIETY

AT THE

ONE HUNDRED AND THIRD ANNIVERSARY

HELD AT

CONCORD, JUNE 18 AND 19, 1894.

Concord, N. H.:
PRINTED BY THE REPUBLICAN PRESS ASSOCIATION.
1894.

NEW HAMPSHIRE MEDICAL SOCIETY.

OFFICERS FOR 1894–'95.

PRESIDENT.

DAVID P. GOODHUE, M. D., Springfield.

VICE-PRESIDENT.

E. F. McQUESTEN, M. D., Nashua.

TREASURER.

M. H. FELT, M. D., Hillsborough Bridge.

SECRETARY.

GRANVILLE P. CONN, Concord.

EXECUTIVE COMMITTEE.

CHARLES R. WALKER, M. D., Concord.
GEORGE D. TOWNE, M. D., Manchester.
F. A. STILLINGS, M. D., Concord.
W. T. SMITH, M. D., Hanover.
F. E. KITTREDGE, M. D., Nashua.

ANNIVERSARY CHAIRMAN.

ROBERT BURNS, M. D., Plymouth.

COMMITTEE ON ARRANGEMENTS.

F. A. STILLINGS, M. D., Concord.
D. EDWARD SULLIVAN, M. D., Concord.
ARTHUR K. DAY, M. D., Concord.
CHARLES W. LOVEJOY, M. D., Concord.
N. W. M'MURPHY, M. D., Concord.

COUNCIL.

A. G. STRAW, M. D., Manchester.
D. S. ADAMS, M. D., Manchester.
W. K. WADLEIGH, M. D., Hopkinton.
D. EDWARD SULLIVAN, M. D., Concord.
H. A. WEYMOUTH, M. D., Andover.
E. L. CARR, M. D., Pittsfield.
G. D. FROST, M. D., Hanover.
S. N. WELCH, M. D., Sutton.
J. W. STAPLES, M. D., Franklin Falls.
G. S. GOVE, M. D., Whitefield.
G. H. SALTMARSH, M. D., Lakeport.
EDWARD FRENCH, M. D., Concord.
J. F. ROBINSON, M. D., Manchester.
JOHN W. PARSONS, M. D., Portsmouth.
S. M. DINSMORE, M. D., Keene.
T. B. SANBORN, M. D., Newport.
D. L. STOKES, M. D., Rochester.
M. H. FELT, M. D., Hillsborough Bridge.
C. B. HAMMOND, M. D., Nashua.
C. A. FAIRBANKS, M. D., Dover.

BOARD OF CENSORS.

DANIEL S. ADAMS, M. D., Manchester.
GEORGE D. TOWNE, M. D., Manchester.
THOMAS HILAND, M. D., Concord.
JOHN W. PARSONS, M. D., Portsmouth.
CHARLES B. DRAKE, M. D., West Lebanon.
LEONARD JARVIS, M. D., Claremont.
J. C. EASTMAN, M. D., Hampstead.
IRA J. PROUTY, M. D., Keene.
M. C. LATHROP, M. D., Dover.

OFFICERS OF THE BOARD TO ISSUE LICENSES.

DANIEL S. ADAMS, M. D., Manchester, President.
THOMAS HILAND, M. D., Concord, Secretary.
JOHN W. PARSONS, M. D., Portsmouth, Associate.

TRUSTEES.

LEVI G. HILL, M. D., Dover, for three years.
W. T. SMITH, M. D., Hanover, for two years.
JOHN W. PARSONS, M. D., Portsmouth, for one year.

COMMITTEE ON PUBLICATION.

G. P. CONN, M. D., Concord.
M. H. FELT, M. D., Hillsborough.

(The Publication Committee desire to have it understood that the publication of any paper does not constitute an endorsement by the society.)

DELEGATES TO STATE SOCIETIES.

Maine—T. S. FOSTER, M. D., Laconia.
GEO. W. M'GREGOR, M. D., Littleton.
Vermont—EDWARD ABBOTT, M. D., Tilton.
H. K. FAULKNER, M. D., Keene.
Massachusetts—GEORGE M. KIMBALL, M. D., Concord.
H. T. BOUTWELL, M. D., Manchester.
Rhode Island—D. L. STOKES, M. D., Rochester.
F. W. SPAULDING, M. D., Epping.
Connecticut—A. W. SHEA, M. D., Nashua.
W. R. GARLAND, M. D., Campton.

American Medical Association—Voted, That the Executive Committee and the secretary fill our delegation from such members as shall signify a desire to represent the Society.

N. B.—The next annual meeting of the American Medical Association will be holden in the city of Baltimore, Md., the first week in June, 1895. Members of the New Hampshire Medical Society wishing to attend should file their names with the secretary before February 1, 1895.

COMMITTEE ON THE HISTORY OF MEDICINE IN NEW HAMPSHIRE.

I. A. WATSON, M. D., Concord.
WILLIAM CHILD, M. D., New Hampton.
J. W. PARSONS, M. D., Portsmouth.
WILLIAM T. SMITH, M. D., Hanover.
G. P. CONN, M. D., Concord.

All communications intended for this committee should be addressed to the chairman, Dr. Irving A. Watson.

The next annual meeting of the New Hampshire Medical Society will be held in Concord, the last Thursday and Friday in May, 1895.

All communications intended for the society should be addressed to the secretary, G. P. Conn, M. D., Concord, N. H.

NEW HAMPSHIRE MEDICAL SOCIETY.

PROCEEDINGS

OF THE

ONE HUNDRED AND THIRD ANNIVERSARY.

MORNING SESSION, MONDAY, JUNE 18, 1894.

The Fellows of the society assembled in the hall of the G. A. R., in Concord, at 11 o'clock.

The meeting was called to order by Dr. Walker, Chairman of the Executive Committee, who announced to the society that the president, Dr. Samuel P. Carbee, of Haverhill, was seriously ill, and would be unable to be present. He, therefore, called the vice-president, Dr. David P. Goodhue, of Springfield, to the chair.

Dr. Goodhue, after expressing regret for the illness of our honored president, called upon the chaplain, Rev. Dr. Ayer, of Concord, to open the meeting with prayer.

PRAYER.

Our Heavenly Father: We lift our hearts unto Thee gratefully this morning, for Thou art the giver of every good and perfect gift unto us. Thou dost give us ourselves, and all our capacities for service, both to Thee and to our fellow-men.

O Lord, we thank Thee for all that has been done in this

age in which we live to alleviate human suffering. We thank Thee for that sympathy which binds our hearts together. We thank Thee for the willing hands and longing hearts, that, as we behold the sufferings of others, enable us to minister to them. We thank Thee for those many who have devoted their lives to this noble profession, and have given themselves, their time, their study, their capacity, their efforts, that they may alleviate human suffering, and make homes of distress glad.

We thank Thee for this organization, for the years it has existed, and for the members who have been upon its roll from generation to generation. Bless those who are now active in it. Grant them, we pray, Thy Spirit. Reward them for their labor, for their self-denial, for their patience, and for their ministrations. Aid them in this service to-day and to-morrow, and may this meeting, we pray Thee, be helpful in its earnestness of spirit, and instructive in preparation for coming work. May their sympathies with one another, and with those who are suffering, be quickened as these go out; and may they bear the influence of this meeting with them, to make light many an hour that otherwise would be lonely, many a study that otherwise would seem lost and useless.

Let Thy blessing rest upon the absent President. Grant healing unto him, Thou Great Physician. Unto all the officers and the absent members of this Society grant Thy blessing. The memories of those whom Thou hast taken, memories that still abide and are treasured in many homes where they have ministered in sickness and distress, make Thou precious to us all.

Give to us all to serve Thee faithfully, and by and by, when our labor on earth shall have been done, we pray that Thou wilt grant unto all these to hear, as they have devoted their lives to this noble work of sympathy and relief of suffering, "Inasmuch as ye did it unto one of the least of these, my brethren, ye did it unto me." And thine shall be the praise forever. Amen.

Dr. Hill, of Dover, offered the following preamble and resolution:

Mr. President: We are just informed that our president elected last year, is too ill to be present to-day, and we may be deprived of his presence and his paper. Therefore, be it

Resolved, That a vote of sympathy and condolence be extended to Dr. Carbee and family, and that if he is not present at this meeting, he be requested to forward his address to the Committee on Publication for insertion in our transactions.

Adopted.

The President appointed the following committees:

COMMITTEE ON THE RECEPTION OF DELEGATES.

Dr. C. R. Walker, Concord.
Dr. F. A. Stillings, Concord.
Dr. A. P. Richardson, Walpole.

COMMITTEE ON EXAMINATION OF PATIENTS.

Dr. Hill, Dover.
Dr. Towle, Deerfield.
Dr. Burnham, Manchester.
Dr. Sanborn, Henniker.
Dr. Child, New Hampton.

Dr. Richardson, from the Committee on the Reception of Delegates, presented to the President, Dr. Hill, of Bellows Falls, Vt.

The President.—I have the honor to introduce to the society Dr. Hill, who represents the Connecticut River Valley Association.

DR. HILL OF BELLOWS FALLS.

Fellows of the New Hampshire Medical Society: I do not think that at this time I should take up your attention by any remarks of mine, especially as I am a new comer, it being the first time I have ever attended your state society. But I am glad to be here, and shall hope to go back to my own state, and my own society, with pleasant recollections, as I have no doubt I shall, of the New Hampshire State Medical Society. I thank you all. [Applause.]

The records of the last meeting having been printed, on motion of Dr. Walker, their reading was dispensed with.

Dr. F. A. Stillings, chairman of the Committee of Arrangements, reported that the annual dinner would be served at the New Eagle Hotel, on Tuesday at 1 p. m.

That after the council meeting to-night, Prof. E. J. Bartlett of Dartmouth College will deliver an address on Potable Water; that after this address there will be a reunion of the alumni of Dartmouth Medical College.

Dr. Stillings also reported to the society the invitation of Surgeon General Cook and other medical officers of the New Hampshire National Guard to visit the camp-ground this afternoon at 5 o'clock to witness the brigade review. The chairman reported that barges would be ready in the street near the hall to take the members over. The invitation was accepted.

The Executive Committee, through its chairman, Dr. Walker, reported the programme arranged for the meeting, and asked that members of district societies would report to the Executive Committee any good papers that might be read during the year.

The morning business having been concluded, the reading of medical papers and communications was commenced. The first being a dissertation on "The Prevention of Communicable Diseases," by D. Edward Sullivan, M. D.," of Concord, the discussion upon which was opened by William Child, M. D., of New Hampton.

The next paper on the programme, an essay on "Sleep—How Best Induced in Certain Pathological Conditions," by J. B. Raynes, M. D., Lebanon, was read by its title and laid on the table as Dr. Raynes was not present.

The next paper, a "Report on Cases of Puerperal Infection," by J. Elizabeth Hoyt, M. D., Concord, was read, and a discussion opened by Dr. Conn, of Concord, continued by Drs. Hill of Dover and Adams of Manchester. These papers were referred to the Publication Committee, and the society adjourned until 2 o'clock for dinner.

AFTERNOON SESSION.

The society assembled at 2 o'clock, and was called to order by the vice-president.

Dr. A. G. Straw, of Manchester, delivered an oration on "Retrospective Glances."

Dr. D. S. Adams, of Manchester, read a report on "Bone Surgery," followed by Dr. Robert Burns, of Plymouth, on "Exsection of the Astragalus."

Discussion was opened by Dr. Conn, and continued by Drs. Hill and Smith.

The report on "Empyema," by Dr. William H. Lyons, of Manchester, was read by its title and referred to the Committee on Publication, as Dr. Lyons was not present. All were referred to the Committee on Publication.

Dr. W. K. Wadleigh, of Hopkinton, who was to read a dissertation on "The Differential Therapeutics of Strophanthus and Digitalis," reported that he had not finished his work, and asked to be continued another year.

MORNING SESSION.

TUESDAY, June 19, 1894.

Called to order at 8:30 a. m., by the vice-president, Dr. D. P. Goodhue.

The first business being the report of the council, the secretary read the following

REPORT.

The council met in the G. A. R. hall, and was called to order at 7:30 p. m., the vice-president presiding.

The secretary called the roll of the members, and the following were found to be present:

GEORGE H. SANBORN, M. D., Henniker.
S. N. WELCH, M. D., Sutton.
JOHN F. ROBINSON, M. D., Manchester.
W. H. PATTEE, M. D., Manchester.
M. H. FELT, M. D., Hillsborough Bridge.

S. M. Dinsmoor, M. D., Keene.
C. P. Frost, M. D., Hanover.
A. G. Straw, M. D., Manchester.
D. S. Adams, M. D., Manchester.
D. Edward Sullivan, M. D., Concord.
H. A. Weymouth, M. D., Andover.
E. L. Carr, M. D., Pittsfield.

To take the places of absent members, the following members were elected, and all vacancies were filled:

Prof. W. T. Smith, Hanover, to take the place of Dr. Aldrich.
Dr. D. M. Currier, Newport, to take the place of Dr. Raynes.
Dr. G. H. Towle, Deerfield, to take the place of Dr. Harriman.
Dr. A. N. Smith, Dover, in place of Dr. Sanborn, Newport.
Dr. L. G. Hill, Dover, in place of Dr. Davis, Merrimack.
Dr. John Wheeler, Pittsfield, in place of Dr. Stokes, Rochester.
Dr. J. W. Parsons, Portsmouth, in place of Dr. Odell, Greenland.
Dr. I. A. Watson, Concord, in place of Dr. W. K. Wadleigh.

The following applicants for membership, being members of district societies, were recommended without discussion:

Dr. John D. Quackenbos, New London.
Dr. J. R. Nilsen, Sunapee.
Dr. E. O. Crossman, Lisbon.
Dr. S. E. Randall, Bath.
Dr. Benjamin Chever, Portsmouth.
Dr. W. O. Dunham, Plaistow.
Dr. Walter Colfax Matthews, Walpole.
Dr. E. G. Annable, Concord.
Dr. Elizabeth B. Reed, Keene.
Dr. Chauncey Adams, Concord.
Dr. Emile St. Hilaire, Concord.

The following applicants for membership, not being members of district societies, were considered separately and recommended for membership:

Dr. John L. Burnham, Manchester.
Dr. Eddy Benjamin Swett, Goffstown.
Dr. Frederick H. Eames, Manchester.
Dr. Herman J. Ackard, Manchester.
Dr. Clarence Samuel Bartlett, Concord.
Dr. Arthur F. Wheat, Manchester.
Dr. C. J. Jordan, Bradford.
Dr. C. S. Abbott, Laconia.
Dr. A. S. Bolster, Belmont.
Dr. E. E. Hill, Suncook.
Dr. Warren P. Grimes, Northwood.

On motion of the secretary, Dr. William H. Nute was given leave to be reinstated.

On motion of Dr. I. A. Watson, seconded by Dr. C. P. Frost, Prof. E. J. Bartlett, of Hanover, was recommended for honorary membership.

On motion of the treasurer, Dr. C. A. Sanborn, of Redlands, Cal., and Dr. Fred E. Wheat, of Plover, Wis., were allowed to be placed on the retired list; also Dr. Luther Pattee, of Manchester, and Dr. Samuel G. Dearborn, of Nashua, were placed on the retired list, after their own request, by reason of illness.

Leave was granted Dr. Eugene Wasson, of Hancock, to be reinstated upon the payment of arrears.

A year ago the applications of Dr. Frederick Perkins, of Manchester, and Dr. Frank H. Rowe, of Bedford, were referred to the delegation from Manchester for information. Dr. D. S. Adams, of Manchester, reported that these cases have been submitted to thirty-three members of the society in Manchester, and that it was voted by the delegation not to recommend Dr. Perkins for membership, but the same delegation did recommend Dr. Rowe. The report was accepted to be placed on file, and Dr. Rowe was recommended by the council for membership.

A letter was read by the secretary from the American Academy of Medicine at Philadelphia saying that this association expects to hold its annual meeting at the Waumbek, Jefferson, on the 29th and 30th of August next, and extending a cordial invitation to members of our state society to be present at any

or all of its scientific sessions, and saying that Dr. Frederick H. Gerrish, of Portland, was the chairman of the Committee on Arrangements. It was voted to accept the invitation, and as many as possible to attend the meeting.

Dr. S. N. Welch of Sutton discussed the propriety of changing the time of holding our annual meetings, saying that an earlier session would be very desirable on account of the great heat which we usually have in June. This was discussed by various members of the council, and, on motion of Dr. Straw, of Manchester, it was voted that the next annual meeting be held the last Thursday and Friday in May, 1895.

The report of the council was accepted and ordered placed on file.

It was voted that all the applicants for membership who were present at the meeting be elected on their signing the constitution and registering. The following were found to be present:

Arthur C. Heffenger, M. D., Portsmouth.
Benjamin Chever, M. D., Portsmouth.
Edwin G. Annable, M. D., Concord.
John D. Quackenbos, M. D., New London.
Augustus S. Bolster, M. D., Belmont.
Elizabeth B. Reed, M. D., Keene.
Warren P. Grimes, M. D., Northwood.
Chauncey Adams, M. D., Concord.
Clifton S. Abbott, M. D., Laconia.
Emile St. Hilaire, M. D., Concord.
E. B. Swett, M. D., Goffstown Centre.
W. C. Matthews, M. D., Walpole.
Frank Henry Rowe, M. D., Bedford.
John L. Burnham, M. D., Manchester.
H. J. Ackard, M. D., Manchester.
Arthur J. Wheat, M. D., Manchester.
Fred H. Eames, M. D., Manchester.
Clarence S. Bartlett, M. D., Concord.
Edmund E. Hill, M. D., Suncook.

Others who were not present to sign the constitution were given more time, and their applications for membership laid

upon the table for one year. This completed the report of the council, and the new members were introduced to the association.

Reports being in order, the delegates to Dartmouth Medical College reported as follows:

MANCHESTER, N. H., June 18, 1894.

To G. P. Conn, M. D., Secretary N. H. Medical Society:

SIR: On November 20th and 21st, 1894, we visited Hanover as delegates from the N. H. Medical Society to assist in the final examination of the graduating class of Dartmouth Medical College.

Dr. J. H. Linsley, of Burlington, and Dr. C. S. Caverly, of Rutland, Vermont, joined us as delegates from their state society.

The afternoon and evening of Monday, and the forenoon of Tuesday, were given to the work of looking over the written examinations already completed, and to that of conducting the oral examinations in a class of thirty-five students, of whom twenty-eight were graduated. The system of marking and ranking employed by the faculty was evidence to the well known fact that honest and faithful work only can merit a diploma from this college.

Tuesday evening witnessed the graduating exercises, at which President Tucker presided, deepening the impression everywhere prevailing that he is the right man in the right place.

Although previous reports have favorably noticed the Mary Hitchcock hospital, we cannot refrain from saying that it is truly elegant in all its appointments, and that we believe it to be the best hospital of its size in the United States.

Our thanks are due the faculty for the courtesy and many tokens of kindness which we received at their hands.

D. S. ADAMS, M. D.
A. NOEL SMITH, M. D.

Reports of delegates to other societies and reports of district societies were read by their titles and referred to the Committee on Publication.

The treasurer's and auditors' reports were submitted by the treasurer, and also the report of the trustees.

TREASURER'S REPORT.

To the N. H. Medical Society:

Your treasurer for the year ending June 18, 1894, presents the following report:

Dr.

September 28, 1893. To cash received from J. W. Parsons, M. D., Treasurer *pro tem.*:		
To Merrimack County Savings Bank book	$521.45	
To N. H. Savings Bank book . .	152.94	
To J. W. Parsons, check . . .	157.71	
June 16, 1894, To dues collected to date	187.00	
		$1,019.10

Cr.

1893.			
Sept. 28.	By cash paid Am. Express .	$0.70	
Nov. 21.	By cash paid H. F. Smart .	.90	
Dec. 5.	By cash paid Crawford & Stockbridge . . .	5.50	
1894.			
Jan. 3.	By cash paid Republican Press Association . .	249.60	
May 17.	By cash paid Republican Press Association . .	2.50	
	By cash paid M. H. Felt sundries . . .	5.60	
		$264.80	
Balance in Treasury		754.30	
			$1,019.10

Respectfully submitted:

M. H. FELT, *Treasurer.*

Hillsborough Bridge, June 16, 1894.

The undersigned have examined the books and accounts of the treasurer, and found them correctly kept and properly vouched, with balance in hands of treasurer of $754.30.

L. G. Hill,
William T. Smith,
J. W. Parsons,
Auditors.

Concord, June 18, 1894.

TRUSTEES' REPORT.

CONCORD, June 19, 1894.

The Trustees submit the following report of funds in their care:

The Bartlett fund, on deposit in the Portsmouth Savings Bank, amounted at the last report to	$2,160.57
January 1, 1894, interest entered on the bank book	65.28
Total	$2,225.85

Three hundred and fifty-two dollars eleven cents of this amount is by the terms of the bequest a permanent fund, leaving the sum of $1,873.74 to the order of the society.

The Pray fund, on deposit in the Strafford Savings Bank at Dover, amounted at last report to	$1,092.82
April 1, 1894, interest entered on the bank book . .	43.83
Total	$1,136.65

The original fund was one thousand dollars, the income only of which can be expended for a specific purpose.

There have been no disbursements from either fund since last report.

No essay for the Pray prize has been presented during the year.

The society, through the trustees, will offer a prize of seventy-five dollars this year, and circulars regarding the rules relating to the essay will be issued only to the members by the trustees.

LEVI G. HILL,
J. W. PARSONS,
WILLIAM T. SMITH,
Trustees.

Report accepted.

The Report on Necrology, by Dr. Berry, of Portsmouth, was read by its title, and obituary notices of deceased members will be found in their proper place in the Transactions.

The following papers were then read, except the President's Address, which was necessarily omitted, as he was unable to be present; and the essay on "Some Observations concerning

Sanitation in Mexico," by Dr. Conn, was read at the time the President's Address should have been submitted.

At 11 o'clock the election of officers took place according to the By-Laws, with the following result:

PRESIDENT.

DAVID P. GOODHUE, M. D., Springfield.

VICE-PRESIDENT.

E. F. McQUESTEN, M. D., Nashua.

TREASURER.

M. H. FELT, M. D., Hillsborough.

SECRETARY.

GRANVILLE P. CONN, M. D., Concord.

EXECUTIVE COMMITTEE.

CHARLES R. WALKER, M. D., Concord.
GEORGE D. TOWNE, M. D., Manchester.
F. A. STILLINGS, M. D., Concord.
W. T. SMITH, M. D., Hanover.
F. E. KITTREDGE, M. D., Nashua.

ANNIVERSARY CHAIRMAN.

ROBERT BURNS, M. D., Plymouth.

COMMITTEE OF ARRANGEMENTS.

F. A. STILLINGS, M. D., Concord.
D. EDWARD SULLIVAN, M. D., Concord.
ARTHUR K. DAY, M. D., Concord.
CHARLES W. LOVEJOY, M. D., Concord.
N. W. McMURPHY, M. D., Concord.

COUNCIL.

A. G. STRAW, M. D., Manchester.
D. S. ADAMS, M. D., Manchester.

W. K. WADLEIGH, M. D., Hopkinton.
D. EDWARD SULLIVAN, M. D., Concord.
H. A. WEYMOUTH, M. D., Andover.
E. L. CARR, M. D., Pittsfield.
G. D. FROST, M. D., Hanover.
S. N. WELCH, M. D., Sutton.
J. W. STAPLES, M. D., Franklin Falls.
G. S. GOVE, M. D., Whitefield.
G. H. SALTMARSH, M. D., Lakeport.
EDWARD FRENCH, M. D., Concord.
J. F. ROBINSON, M. D., Manchester.
JOHN W. PARSONS, M. D., Portsmouth.
S. W. DINSMOOR, M. D., Keene.
T. B. SANBORN, M. D., Newport.
D. L. STOKES, M. D., Rochester.
M. H. FELT, M. D., Hillsborough Bridge.
C. B. HAMMOND, M. D., Nashua.
C. A. FAIRBANKS, M. D., Dover.

BOARD OF CENSORS.

DANIEL S. ADAMS, M. D., Manchester.
GEORGE D. TOWNE, M. D., Manchester.
THOMAS HILAND, M. D., Concord.
JOHN W. PARSONS, M. D., Portsmouth.
CHARLES B. HAMMOND, M. D., Nashua.
CHARLES B. DRAKE, M. D., West Lebanon.
LEONARD JARVIS, M. D., Claremont.
J. C. EASTMAN, M. D., Hampstead.
IRA J. PROUTY, M. D., Keene.
M. C. LATHROP, M. D., Dover.

OFFICERS OF THE BOARD TO ISSUE LICENSES.

DANIEL S. ADAMS, M. D., Manchester, President.
THOMAS HILAND, M. D., Concord, Secretary.
JOHN W. PARSONS, M. D., Portsmouth, Associate.

TRUSTEES.

LEVI G. HILL, M. D., Dover, for three years.
W. T. SMITH, M. D., Hanover, for two years.
JOHN W. PARSONS, M. D., Portsmouth, for one year.

COMMITTEE ON PUBLICATION.

G. P. CONN, M. D., Concord.
M. H. FELT, M. D., Hillsborough.

DELEGATES TO STATE SOCIETIES.

Maine—T. S. FOSTER, M. D., Laconia.
G. W. M'GREGOR, M. D., Littleton.
Vermont—EDWARD ABBOTT, M. D., Tilton.
H. K. FAULKNER, M. D., Keene.
Massachusetts—G. M. KIMBALL, M. D., Concord.
H. T. BOUTWELL, M. D., Manchester.
Rhode Island—D. L. STOKES, M. D., Rochester.
F. W. SPAULDING, M. D., Epping.
Connecticut—A. W. SHEA, M. D., Nashua.
W. R. GARLAND, M. D., Campton.

American Medical Association.—*Voted*, That the Executive Committee and the Secretary fill our delegation from such members as shall signify a desire to represent the Society.

N. B.—The next annual meeting of the American Medical Association will be holden in the city of Baltimore, Md., the first week in June, 1895. Members of the New Hampshire Medical Society wishing to attend should file their names with the secretary before February 1, 1895.

COMMITTEE ON THE HISTORY OF MEDICINE IN NEW HAMPSHIRE.

I. A. WATSON, M. D., Concord.
WILLIAM CHILD, M. D., New Hampton.
J. W. PARSONS, M. D., Portsmouth.
WILLIAM T. SMITH, M. D., Hanover.
G. P. CONN, M. D., Concord.

Programme for the next annual meeting, as submitted by the Executive Committee:

ORATORS.

G. D. FROST, M. D., Hanover.
S. N. WELCH, M. D., Sutton.

SUBSTITUTE ORATORS.

G. S. GOVE, M. D., Whitefield.
J. W. STAPLES, M. D., Franklin Falls.

REPORT ON SURGERY.

J. F. ROBINSON, M. D., Manchester.

ESSAYS.

(Subjects to be optional.)

EDWARD FRENCH, M. D., Concord.
W. R. WADLEIGH, M. D., Hopkinton.
H. A. WEYMOUTH, M. D., Andover.
G. H. SALTMARSH, M. D., Lakeport.
S. W. ROBERTS, M. D., Wakefield.

NECROLOGY.

JOHN J. BERRY, M. D., Portsmouth.

The remainder of the programme was again taken up until disposed of, and at 1 o'clock the society adjourned to the New Eagle hotel for the anniversary dinner, after which the anniversary chairman, Dr. Ira J. Prouty, of Keene, called the society to order, and in a happy manner presented the Fellows and their guests taking part in the *post-prandial* exercises.

The society then adjourned to the last Thursday and Friday in May, 1895.

POST-PRANDIAL EXERCISES.

Dr. Prouty opened the exercises as follows:

Fellows of the New Hampshire Medical Society, Ladies and Gentlemen: In looking over this assembly, I have been forcibly reminded that theory and practice do not always go hand in hand, for I doubt if any one of you would advise your

patients to partake so unsparingly as you have apparently done here this hot day. The late Sir Andrew Clarke was at a banquet, and noticed that the lady sitting next him passed a certain dish of which she was very fond, and to which he helped himself abundantly; he asked her if she did not like it, as it was excellent. She replied, "Oh, yes! I like it but my physician forbade me to eat it." "Stuff and nonsense," said Sir Andrew; "it could not hurt any one. Who is your physician?" to which the lady, whom the medical magnate had entirely forgotten, answered, with a twinkle in her eye, "Sir Andrew Clarke."

Another year has rolled around and been added to the life history of this society. It has brought joy and sadness to all of us; every year brings its changes, which are noticeable at our annual gatherings. The familiar faces of those long in the ranks are being missed one by one, and new countenances are seen and new voices heard in our discussions and around our banquet board.

As we look back over the century that marks the years of the New Hampshire Medical Society, and think of the work done here by the thoughtful, earnest men that have spent their lives riding over the hills and through the valleys of this rough yet productive state, on their mission to relieve suffering humanity, we find that they have added their mite to the treasure-box of medical knowledge, and many of their names are known far beyond the limits of their native or adopted state.

As I was visiting the wards of Guy's Hospital, London, the place where the scholarly and courtly Sir Astley Cooper did his work, and from whence he led surgical thought, a patient was brought in with an intercapsular fracture of the femur, and my thoughts immediately went back to the work done by a former president of this society. Cooper taught in his lectures, manuscript notes of which I have, that bony union *never* resulted after a fracture at this point; and it was a New Hampshire surgeon who taught him that he was wrong, and that surgeon was Reuben D. Muzzey. A Vermont farmer had been to Boston with his team laden with produce, and on his way home, at Chelmsford, met with an accident, the result of which was a fracture of the neck of the femur, diagnosed and

treated by the late Dr. John C. Dalton, who was then fresh from lectures. After a few weeks the patient became naturally restless, and was carried on his team to his northern home among the Vermont hills, where Professor Muzzey saw the case, and doubted the diagnosis as the result had been so good, and quite a controversy arose between the young Massachusetts physician and New Hampshire's ablest surgeon. After a few years the man died of an acute disease, and history does not tell us how Muzzey obtained the femur that caused the dispute, and to his astonishment found that there had been a fracture within the capsule, and bony union had been the result. A few years afterwards, armed with this trophy, he visited England and the eminent surgeon. He handed the specimen to Cooper, who looked at it intently for a time and then asked, "Where is the other leg?" Of course the reply was that it was not brought. "Well," answered Cooper, "both might have been alike; the man might have been born so." As much as he disliked to own that his teachings had been wrong, it was noticed that afterwards his statements on that point were not quite so emphatic.

Many of the men who have been connected with this society have done original work that has added much to the relief of human suffering. A feeling of sadness has often come to me as I have thought of the hard work and hours of study that many of them have given, and the success that has crowned their labors, and yet no records are left to help those of younger years.

There is not one of you, no matter how far remote your field of labor may be, but what has cases continually occurring, that if an authentic record was kept, would not only prove profitable, but interesting to your fellow-practitioners. As I say, think of the strong men who have finished their work and gone over to the "silent majority," and have left no history of their labors. Let me urge upon all of you, who have more recently entered the arena of medical practice, to keep a case book and there place on record your successes and failures, for it is by our failures that we profit. Do this not only for your own good, but for the help of your fellows, and not have it said of you "That the good is interred with his bones."

Let us all keep abreast with the times in which we live, "keeping step to the music that we hear."

It has been my privilege the past year to spend five months among the surgeons of Great Britain and Europe, and I have returned firmly convinced that America takes the lead in practical work among the nations, and that although one of the smaller commonwealths, New Hampshire has done not a little in putting our country, of which we are all proud, to the front.

The New Hampshire Medical Society, founded by men of prudence and sagacity, upheld for one hundred years by an unbroken succession of earnest, active, and able workers, many of whom have achieved national renown; never failing in its devotion to the welfare of suffering humanity, it stands to-day and we trust will ever stand, as the faithful exponent of rational medicine.

PRESIDENT D. P. GOODHUE.

Mr. Chairman, Ladies and Gentlemen: In responding to the sentiment offered by our chairman I cannot but feel that if our honored president, who is absent on account of sickness, were here, he would respond in a more fitting manner than I can.

It is true that the New Hampshire Medical Society was founded by men who saw that it was for their best good and for the best good of the public that a society should be formed where the medical men of the state could meet and discuss what they could best do to relieve suffering humanity from the ravages of disease. The same spirit that called them together more than a hundred years ago calls us together to-day, and has continued to call the earnest and active men of our profession for all these years. The members of this society have ever been striving to combat disease in every form and condition in which it has appeared.

As the years have increased, our knowledge of disease and the methods of preventing diseases have increased, so that we can see that a grand improvement has been made in the prevention and treatment of disease. This society has ever stood, and we know will ever stand, for that which it considers to be

for the health and best interest of the citizens of the whole state. If we have been accused of advocating the passage of laws for our own protection we know that it was not for our own protection, but for the protection of the people from professional frauds that we have asked to have laws enacted.

This is an age of improvements in almost all things medical and surgical, and this society intends to be the exponent of all rational medicine. But while profiting by the new methods and medicines let us not forget the old ones that have been proved to be good, ever remembering the command, "Praise all things, and hold fast to that which is good."

New Hampshire—A rough, yet productive land, that stands high in the sisterhood of states, the pride of her native or adopted sons, through all the years that make up the century and a half of her existence. Our chief executive is with us to-day, a worthy successor to the long line of noble men that have filled the gubernatorial chair.

HON. JOHN B. SMITH.

Mr. President, and Gentlemen of the New Hampshire Medical Society: It has been my privilege at different times to be the guest of the various trades and professions of our people. I have thus been honored by the ministers and the lawyers, the veteran soldiers, and the farmers and boards of trade: but until to-day it has never been my pleasure to stand in the presence of the assembled doctors of the state, the membership of the New Hampshire Medical Society.

On all these occasions I have never forgotten, never for a moment lost sight of, the fact that the respect and honor paid to me, are paid and due to the office and not the man.

And yet, I could never quite divest myself of my own personality, and my nature, modestly, would always assert itself; and so my addresses, if I may so dignify my humble talk, on such occasions have been remarkable chiefly for their brevity. In addressing the lawyers, especially, I have been careful to be *brief*, and now, in the presence of the doctors, I shall not attempt to change or reverse our relative positions and put you in the place of the *patient*, but on the contrary, I shall be

careful not to offend or tax your *patience*. In this sin-cursed and disease-stricken world we all, at times, have recourse to the doctor. None of us are exempt from sickness, pain, and accident. Our obligation and dependence are freely acknowledged.

I have heard it said that those patients who pay their doctors' bills most promptly live the longest, or at least get well the soonest. If this is intended as a reflection upon your noble profession, however, I repel it with disdain as an unjust libel; and yet, I confess myself to be a little superstitious on this point, just to the extent that I am always careful to pay my own doctor's bills promptly. Now I know that physicians as a class are not given to superstition; on the contrary they are known as a hard, matter-of-fact sort of men, and yet I venture to say that few or none of you would take any special pains or go very far out of your way to discourage a little superstition of this sort in your patients. But as I said before, this little attempt at pleasantry is not intended as a reflection upon your noble profession; for excepting the ministry of our holy religion, there is no nobler, more benevolent, or more beneficent calling than yours. Insomuch as the soul outweighs the body in value and importance, by so much is the clergyman's calling above yours. The minister of religion cares for the souls of men, and the doctor cares for their bodies. Purity of soul, it is said, conduces to the health of the body; and on the other hand, a healthy body is all the more fit as the earthly tenement of a pure soul. So these two offices, the ministry to the body and the ministry to the soul, are inter-dependent and mutually helpful.

I would be glad if I had words fit to express the tribute I would pay to the faithful physician. How cheerfully, as well as promptly, he responds to every call of distress and suffering, at all hours of the day and of the night as well, in fair weather and foul weather, in sunshine and in storm; and whether the call comes from the poor who cannot pay, or from the rich.

The true physician is an enthusiast in his profession. He loves the work better than the pay. Of no other merely secular calling can this be so truly said.

In the science of medicine great discoveries and changes

have been made in recent years. Old theories have been discarded, and old practices abandoned. Some of the papers that were read before your society fifty, or even thirty, years ago, would to-day provoke a smile, if they did not excite contempt.

Probably in no science have there been more useful discoveries in these later years than in the science of medicine, but in medicine as in other science, as in theology, for instance, there are certain great fundamental truths, which never change, which will always stand.

And now I have a word to say as to your society in particular. It has an honorable record of a hundred years. It passed its century mile-stone three years ago, I think. Its members have reflected honor upon this honorable calling, and have gained fame and distinction in their chosen profession beyond the limits of the state; some have been distinguished in other walks of life as well, distinguished as jurists and statesmen, as legislators, and governors of the state, and two New Hampshire physicians, one of them at least a member of this society, had the honor of signing that great charter of not only American liberty, but of the world's liberty, the immortal Declaration of American Independence.

But, Mr. Toastmaster, if I continue longer I will be in danger of breaking my record for brevity, and of really taxing your patience after all.

I wish many more years of prosperity and usefulness for your society, and thank you for your courtesy and kindness, and for the privilege of being your guest on this occasion.

"The clergyman, co-laborer with the physician in the cause of relieving suffering humanity."

REV. DR. AYER.

Mr. Chairman, and Members of the New Hampshire Medical Society: I appreciate very heartily the words spoken by our governor in regard to the relation of the two professions—the ministry and medicine. We cross each other's lines often in homes of suffering, and the clergyman knows and appreciates the physician as perhaps no one else can. I thoroughly believe that the profession which you rep-

resent is the one of self-denial, and that no other profession makes so absolute a surrender of self to the call and service of other people. You give your time absolutely. Every man likes to own his time—his night and his day. But the physician lays himself, by the choice of his occupation, upon the altar of self-sacrifice; his time, his study, his most intent effort, are given in behalf of others, and he comes in contact with people on the worst plane in which he can meet them.

I have sometimes wished, when I have followed the physician in the home, that he could hear some of the words there spoken. I know the notion is very common that nobody wants to see the physician, and that everybody wants to get rid of him as soon as possible. But everybody wants his services, and everybody wants his best; and though the gratitude is not expressed as it ought to be, I assure you that you are not forgotten.

This leads me, fellow-laborers, to a thought in regard to our professional efforts. I believe that every physician, every clergyman, every man that is worthy of his profession, must surrender the best that is in him for that profession, and carry his personality into it to the very highest possible point of achievement. Now, more than ever before, are opportunities given to every profession, your profession and mine, in the changes that are going on. The thought that is in your heart, and the fact that you learn at the bedside, are to be given to the world. You say your field is a small one. That man's field is not small if he touches vitally the whole world in which he lives. That is the one redemption from monotony that sometimes makes the clergyman and the physician feel dissatisfied with their toil. Let us remember that unless we carry into our profession our personality, our effort is of little avail.

I hail with pleasure the meeting of your association, and I appreciate, as others of my profession do, the self-denying, faithful work of the physicians of our state. May God bless each one of you, and, as the years go on, may each one of us in our work feel every year added is so much of positive addition to the world's relief from suffering; and for humanity's sake, may the Divine Being, whom we serve together, bless our labors for the bodies and souls of men!

Our forefathers, in their wisdom, first erected a place of public worship and then looked to the needs for their children's instruction. "They reared the church and the school-house side by side." This is an age of progress; but in no department of human knowledge have there been more rapid strides than in medicine and the allied sciences, especially in methods of instruction.

DR. QUACKENBOS.

Mr. Chairman, and Fellows of the New Hampshire Medical Society: I esteem it a compliment to be asked to speak before your honorable body, of which I am proud to call myself a member, on so important a subject as the medical education of to-day, and to contrast the medical education of the past with the advantages that are now open to young men desiring to enter our profession. I was graduated from the College of Physicians and Surgeons of New York city in 1871. Alonzo Clark, well known to you all, was president of the college, and among the faculty were such men as Willard Parker, T. Gaillard Thomas, John C. Dalton, Henry B. Sands, Markoe, Agnew, and others that I need not name.

It may be interesting to speak of the methods of those days, and of what preparation for examination consisted in. The great object seemed to be to crowd the mind with knowledge that was not particularly practical; in other words, students were crammed for the hospital examinations. At time of examination I well remember how the men would crowd around the professors' private rooms. The examinations were all oral, and were not, therefore, very thorough. One man was examined at a time. When he came out of the examination room his friends asked the subject that was in the professor's mind, and often had time enough to look it up. Sometimes questions that were not altogether in the medical line were asked the students by the professor. I remember one instance where a man was graduated from a medical college under these circumstances: The professor asked the dose of arsenious acid. He answered, "Three grains." Immediately he judged by the expression of the professor's face that it was wrong. He said, "Professor, I promise you I will never give

poison without looking up the dose. Please let me through." And he got his diploma.

One young Cuban was always seen on the streets with Gray's Anatomy under his arm. When asked to describe the *sphenoid* bone, on which the professor had lectured two or three hours, the young man said all he remembered about it was that it *looked like a bat.* He failed to pass.

In those days some professors would repeat their lectures year after year. Alonzo Clark repeated his lectures verbatim thirteen years, and he knew them by heart—the same livers, the same old hearts, and the same old jokes, in their proper place, year after year. In contrast with Dr. Clark was Dr. Loomis, who told me that he always tore up his lectures after he delivered them. He advanced his views so frequently that a lecture delivered one year was likely to be of no use to him the next year.

The student in those times was crammed for a hospital examination. He was expected to learn all that was practical in medicine or surgery at the hospital. Of course only a few gained admission to the hospital, because the opportunities were limited. There was no provision for those who failed to get into the hospital. There was no post-graduate college. The hospital examinations were largely a farce. Men who were very well informed would often be rejected. I have known a singularly able man, who answered every question at a hospital quiz for three months, fail to pass the hospital examination. I have known others at the same examination, who knew almost nothing, to be admitted to the hospital. Of course students felt there was something unfair in that kind of examination.

The general tendency of medical education in the 'sixties was narrow in the extreme. When men went into the hospital they followed their own favorite professors or teachers, and they remained men of one idea. Those of you who prepared for practice in the office of a country practitioner remember the difficulties you had to contend with.

I heard Dr. Prouty say that American post-graduate instruction is, in his opinion, superior to post-graduate instruction in Europe. The present under-graduate instruction certainly

emulates in breadth and thoroughness that of Europe. I had opportunities for inspecting colleges abroad, and I was struck with the great thoroughness of the examinations, which implied wonderful preparation behind it. Applicants for the degree of M. B. were examined day after day at the bedside for two weeks, not by their own professors, but by noted physicians who had no interest in the college, and who purposed to have no one in the profession who was not worthy of it. Our under-graduate colleges to-day are coming up to that foreign standard. We have our four years course; we have our entrance examinations; we require a knowledge of the classics, certainly Latin, for admission. Every facility for the study of foundation subjects is offered at our colleges.

Among the best of post-graduate schools is the New York Post-Graduate Medical College, which numbers among its faculty the brightest men in the medical world. It has now got into new buildings, and is equipped with everything that means progress and advancement in medical science from a practical standpoint. The courses are broadening in the extreme. Six different professors and six assistants lecture and hold clinics daily in each important branch of medicine and surgery. The material for study is as varied as it is vast. The hospital is superior in every respect, and the babies' and children's wards, endowed by charitable women of New York, have no equals in this country.

Of course we all have great respect now for the crucial examinations that the American student is subjected to before he is allowed to enter his profession. He is trained largely in the practical as well as in the theoretical line. He is trained particularly in pathology. The pathological laboratory at the College of Physicians and Surgeons makes those educated twenty years ago wonder at the advance that has been made in the opportunities that can be offered to the student.

I think we all have reason to be thankful that America has taken so solid a stand in preparing young men for this most honorable of professions. As my time is limited, I will not detain you any longer with remarks which have necessarily been very general and desultory.

The New Hampshire Medical Society has the honor of being the first state society to admit ladies to membership, and has never regretted its action, as the work done by them has been a credit to themselves and to the society to which they belong.

DR. BLAYLOCK.

Ladies and Gentlemen: It is unnecessary for me to say that the call of Dr. Prouty finds me unprepared. You will all find that out in a few minutes. I feel it an honor and a privilege to be with you to-day, and I am sure that I voice the sentiments of my sex in saying so. The time has gone by when it would be necessary to make apologies for our existence as physicians.

Yet not so very long since we were not allowed privileges in other parts of the country that we have here in New Hampshire. In the province of Quebec, where I spent my early life, it is only within five years that they have opened the doors to women for the purpose of obtaining a medical education. The University of Bishop's College is, I believe, the only teaching body that admits women to the study of medicine. The Medical Society of Montreal still refuses to admit women as its members, which is much to their disadvantage, as there is a good medical library open only to members of the society.

I was the first woman in the Province of Quebec to obtain a medical diploma. Not only did I meet with great opposition from the physicians, but also from my friends. I was also the first woman to be admitted to the Orleans County Medical Society in Vermont. At my admission the censors took my diploma, looked it over, discussed it and me in my presence, and finally decided that, although they did not want me there, they could not insult my college by refusing me admission. I was not accorded such a reception when I came to New Hampshire.

The world has come to recognize the necessity for women practitioners. In a certain line of medicine I think you will all admit we have perhaps better facilities than you of the opposite sex; of course, in other lines you have the advantage. The world has admitted this, therefore physicians

must, and in most countries women have been permitted to study medicine; yet the few remarks I have made will show you that they have not been admitted to full privileges in certain particulars. Even when I was in college, although we paid matriculation fees and lecture fees and hospital fees on the same basis as gentlemen, yet often we were not admitted to a clinical operation, not because there was any reason of morality or delicacy, but because there was some nice, dainty work going on, and we were not to have the benefit of it.

In Vermont, although I was admitted to the society, its recognition ended there. The New Hampshire Medical Society has treated us in a very different manner.

All honor to the old Granite state that she should have been the first to extend to us the right hand of full fellowship.

[Applause.]

The Connecticut river is the boundary between the Green Mountain and the Granite states; but as far as the profession is concerned there is no dividing line, they working together in perfect harmony, both in private practice and in conducting the examinations at Dartmouth Medical School.

DR. J. S. HILL.

Mr. Chairman, and Members of the New Hampshire Medical Society: If I were not the secretary of the Connecticut River Valley Medical Society I am afraid I should have to refuse to speak here this afternoon; but being the only delegate from Vermont, and the secretary of that society, I feel that those who are not acquainted with it ought to know it.

We are a small society, taking in both sides of the Connecticut river, the Granite and the Green Mountain states, and doing what we can in a social and literary way to better each other. It seems to me that when those men, some of whom are known all over the world in the profession to which we belong, first organized a medical society in Bellows Falls—I believe that was its first home—in 1859, that they had a sight into the future in calling it the Connecticut River Valley Medical Society; not only on account of its being situated in that valley, but on account of its acquiring the characteristics of both sister states. We take in Cheshire and Sullivan counties

in New Hampshire, and Windham and Windsor counties in Vermont, and we thus get the brilliancy of the former united with the industry of the latter.

I am glad to be with you and take part in your meeting, but I do not forget what Shakespeare says, that "Brevity is the soul of wit." Therefore, I will be brief. I thank you all.

[Applause.]

The druggist, the physician's helpmeet.

DR. DINSMOOR.

Ladies and Gentlemen: Twenty-five years ago I became a member of this Society, and this occasion brings thoughts of joy and sadness to mind. There are not more than a score of members out of the three hundred upon the roll who were members when I joined the Society. There are a few of those great-hearted men living who were members at that time, but only a few. Nevertheless, as the Society grows venerable with age it seems to grow younger. I observe that most of the members of the Society to-day are comparatively young men.

I am asked to speak for the helpmate of the physician. Pharmacy at the present time has become elevated to the position of a profession. Twenty-five years ago we could not go into a drug store and see upon the walls a certificate that the druggist was a registered pharmacist. We had no such thing then. We hardly had such a thing then as a college of pharmacy; but at the present time, with the large number of colleges of pharmacy, and the excellent registration laws which we have in this state, the profession of pharmacy is vastly elevated compared with what it was twenty-five years ago.

They are, indeed, the helpmates of the physician. We could not get along without them. We may examine our patients, we may make most careful diagnoses, we may make the most carefully considered prescriptions, but if our prescriptions are not carefully compounded, of the purest drugs, our efforts are utterly in vain. It is certainly a matter for congratulation that the profession of pharmacy maintains such a high standard as compared with that of twenty-five years ago.

Druggists have the right to expect that our prescriptions shall be carefully prepared. They have the right to expect that they will be written in good Latin, or in the plainest English; and for various reasons I prefer the Latin. They have a right to expect that all the characters which are used to indicate the quantities of medicine shall be so plain that there shall be no possible mistake. Not long since I observed in a western medical journal a large number of prescriptions in which the quantities of medicine were written out in full English—ounces, drachms, scruples were all written in full, instead of the characters more commonly used. I saw a prescription book, written recently by a graduate of one of our best medical schools, in which this same plan was adopted. It occurred to me that it was a very good method, for certainly there could be no mistake about the meaning. It has been my custom, although the idea was not originally mine, in writing prescriptions, to use for the ordinary character for drachm, the Greek letter Δ. Our prescriptions should be so written that our meaning can be perfectly understood by the druggist. The druggist, or pharmacist, has the right to expect that of us, and to exact it of us.

On the other hand, the physician has the right to expect of the druggist, or pharmacist—I prefer to use the word "pharmacist"—that he will furnish the purest drugs, and that his prescriptions will be compounded in a scientific manner. If I send my prescription to a drug store I want to know that the pharmacist is capable of compounding the prescription in a scientific manner. I want to know that he is an honest and capable man, and that is as much as I care to know.

Pharmacists regret at the present time that so many physicians furnish the medicines to their patients; and physicians may regret that the pharmacist will persist in so much *counter* prescribing. But where each is actuated by the highest principles of integrity, and where each has the advantage of the educational privileges of the day, there is not much difficulty in the physician and the pharmacist getting along on the best of terms, and for the best interests of their patrons in alleviating the sufferings common to humanity.

It has been remarked that brevity is the soul of wit; and

after so much has been said, and well said, too, I feel that I should do injustice to those who have sat here so long if I should extend my remarks further. [Applause.]

THE CHAIRMAN.—This brings to a close the one hundred and third anniversary, and I trust that the coming year will be one of prosperity to all of you, and that we shall all meet at our next annual gathering.

THE COMING ERA IN MEDICAL SCIENCE.

BY A. GALE STRAW, A. M., M. D.

Ladies and Gentlemen: In the preparation of the address which I have the honor of delivering before you on this occasion, I have been impressed by the prevailing conviction in those circles best fitted to draw conclusions in the scientific as in the philosophical world, that the "*Duty of the hour*," for the benefit and blessing of all classes of mankind, in securing wise legislation and a freer and more untrammelled conception of the duty of man to man and man to God, widening into the various charitable and philanthropic movements, is more distinctly laid upon "Our Profession" than upon any other enginery, social, political, or theological.

Progress is the law of life; and although it may seem trite and commonplace to state formally what must be self-evident, yet, as a text for further remarks, we lay stress upon this fundamental truth, always urging onward and forward the ceaseless activities and changes in the physical as well as the intellectual domain of man's nature.

Every thoughtful observer, be he pessimist or enthusiast, must acknowledge that this spirit of advance is the motor of civilization. Human thought does not swing from one extreme of the arc to the other, from age to age, without gaining sufficient impetus to mark itself upon a higher plane. This were to dwarf the mind to the instinct of the lower orders of being, or to some piece of mechanism regulated by stop-cock and piston. On the contrary, history teaches, and experience confirms the fact, that the tendency of all activity, especially of *mental activity*, is the accumulation of energy

upon one age or era, the gathered impulse of long years of apparently unproductive effort. Perhaps upon some fair day we have stood upon the shores of the ocean and watched the rising tide come in; if so, we cannot fail to have noticed how —not each successive wave, but at intervals—one great overwhelming billow would rush madly over its forerunners, dash itself upon the shore, and, rising higher and higher, lay its final deposit on a higher level than any had reached before. In some such way all nature demonstrates itself and marks the eras of race development.

In no other department of intellectual activity has this been so forcibly exemplified as in the history of medicine. Pain and suffering and death were the original and never-ending lot of human kind, and for it no direct alleviation has been provided by the Divine Author of our being. The note of human woe, of sorrow, of bewildering confusion, has sounded through all the ages, and though philosophy, political economy, the law, and theology have arrogated to themselves, severally and in combination, the claim of lightening the common burden, it has been left to us, the inheritors of the human maxims that underlie the healing art, to seize and control the foes to life and happiness, and to develop the God-given powers of man to their highest uses.

Our profession is, therefore, the outgrowth of human want and human necessity. It does not ally itself to superstitious fear on the one hand, or to selfish ambition on the other. It has attained to the most honorable summit of possible achievement, and to-day all other professions delight to do it honor. But it has not reached this eminence at a single bound. Like science in every other form, it has had its special foes and difficulties, and as it is founded by its inherent constitution, not upon precedent as the law, or unsupported dicta as some systems of philosophy, but upon eternal and demonstrable truths, palpable to the common apprehension yet reaching to the depths of analytical thought, it follows that more martyrs have fallen to this pure cause than in any other field of intellectual action.

In the space at our command it would be impossible to particularize even a few of the leading impulses which led to the

proud eminence of our present position, still less to enumerate the "Signs of the Times," which clearly indicate that high tide has not been reached, and that beyond us, at no great distance, is the pinnacle of supreme success and honor for our beloved profession.

The circumstances and conditions of our primitive race furnished neither the occasion nor the necessity for progress in the sphere of medicine. The native habits of our patriarchal fathers, the simplicity of their modes of life, the pure air they breathed, and the virgin soil which produced almost spontaneously the necessary products for human life, gave them complete immunity from a large class of ills that at the present time harass us on every side. There was present also, the vigor and strength of a race as yet in its childhood, exempt from inherited weakness; the muscular type of organism, as contrasted with the languor and inertia and acquired habits which accompany civilization in aggregations of population, as in cities and crowded districts, hemmed in by artificial customs and exhausted by the mental strain consequent upon what is called high culture. With these, and furnishing their quota of disastrous results, are the false standards of modern social life—competitive living, excessive desire for wealth and distinction, the multitude of projects in business and politics made feasible by the growth of the population and increase of opportunity—these beat and bruise mankind upon the rocks of physical shipwreck, and furnish the perplexing problems that confront the thinker of to-day, but which had no existence in that serene past when the limit of man's life was not measured by "three-score and ten."

But after the lapse of time, after the physical was forced to become subservient to the wants of the mental, after the arts had led the people into relations offensive and defensive, when commerce and trade took their place in the lead, and the peaceful pursuits of husbandry and the rude methods of agriculture gave way to the demands of a more complete life, then were the conditions of a true medical science brought about.

The very first step forward, however, was met by the cohorts of ignorance and folly, led by the more or less interested impostors and charlatans of the time, expressing in their

attitude the natural antipathy of darkness to light, and the ever repeated tendency of mankind to attribute the phenomena of disease and death to a supernatural agency.

Following this period came the reliance upon magic. Knowing nothing of the anatomy of the human body or of the circulation of the blood, the most absurd remedies and appliances were used to conquer the inroads of decay and arrest the precedents of the universal foe. Did time permit, we might picture the scenes of horror and anguish which took place at his approach. Imagining him to be a personal deity, to be placated with sacrifices or won by charms and incantations, bloody and nonsensical rites were instituted, and practised until the slow light of a brighter day began to dawn, and mankind emerged into a partial comprehension of the true laws that govern their security and well-being.

These were the days when headaches were supposed to be Satan in the brain, for the personal element pervaded the realm of the healing art as well as dominated the religious idea.

The bleeding of a finger or of the nose was supposed to be stopped by the tying of a red string between the heart and the affected part. It was thought that the blood would love to linger near the red color, on the doctrine of affinities of like for like; presaging—who knows?—from those far distant days a certain popular school which bases its practices on the famous maxim "*Similia similibus curantur.*"

Three kinds of leaves would, in combination, effect a cure, not because of any one medicinal weed, but because of the number *three* always having a mystical importance. If one received a wound from an ax or a knife, the knife or ax was done up in rags and liniment, and the wound left without treatment. Some of these remedies still linger in out-of-the-way places. Thus, it is not uncommon for some amateur practitioners of this sort to manipulate the *three* sticks over the wound and then bury them under the eaves, or dispose of them in some equally mysterious way; or for some dealers in modern black art to treat hysteria, epilepsy, and other manifestations of nervous disorder, by making an image of dough, and firing at it with a silver bullet enclosed in a fragment of paper containing some cabalistic formula. These practices prove, by their

persistence, the strong hold which the imagination has always had, and still has, upon the untaught mind. And yet, why should we dub by this term the adherents of the old-time powwowing remedies, when we see on every hand the evident workings of the same in the thousand and one devices: the faith cure, the Christian science cure. The pretender and juggler, in every form of deception and pretension flourish like the green bay tree, while the faithful disciple of a beneficent science related to all the highest interests of humanity, is comparatively overshadowed and left to languish in partial obscurity.

Thus, for centuries, has our profession, as the natural expression of human consciousness, been struggling with the problem of emancipation from pain and suffering,—now in the grasp of pagan mythology, now under the influence of a superstitious but all-powerful church—until the untiring researches of the ever active devotees of truth brought forth such a vast accumulation of facts and discoveries that a positive *science* was at last evolved, one which can bear the scrutiny of experiment and reason. To it all sciences contributed a share: chemistry, botany, geology, mineralogy, and natural history all laid their respective tributes at the shrine of medicine, and all stand in organic relations with the complement of all, in this the crowning triumph of the nineteenth century. Is it not humiliating to confess that there still is found a sentiment in favor of the deceiving arts by which the medical juggler gains an ascendancy, and that in many places he is permitted free scope for his practices without let or hindrance from legislative enactment or other expression of an outraged common sense? It must be met by the education of the public in the principles that underlie our claims to purity of intention and honesty of practice, and by general and concerted action on the part of the profession everywhere to root out *fraud*.

But to resume our brief epitome of scientific progress; we find that for many centuries before Christ, and from that time on until it assumed the character and status of a positive science, there have been those who rose above the intellectual tyrannies of their time; and, as if by inspiration, have sought to free themselves from the prevailing prejudices—to fling aside all retarding codes or creeds, and place the practice, the ethics,

the soul, so to speak, of this all-enveloping science on an independent basis.

The galaxy of noble and good men who have thus lived to emblazon the triumphs of unselfish learning,—beginning with Hippocrates, then Aristotle, and later the Alexandrian school, noted for its advance in scientific thought—were men of wonderful force and culture; but they were invariably in advance of their age, and their influence was so inconsiderable as to show but little real progress, and resulted in a partial abandonment of the profession for the more fascinating field of philosophy.

It is impossible for us at this time justly to estimate the difficulties that environed these patient students. The blind stupidity as to the laws of external nature, the ever longing of the masses for a mysterious panacea for every human ill—some *simple* furnished by nature and accessible to all. With these must be considered the civil and political revolutions which disintegrated creeds and systems, dispersed nations, and reformed social structures; and always and everywhere the protest of the ignorant mind against true enlightenment. These were a few of the *objective hindrances* encountered.

But the intricacy and mystery involved in the animal organic structure, and the still more profound phenomena of physiological life, were the subjective problems before which the professional mind bowed in patient, thoughtful toil. In the acquisition of this knowledge the midday hour rarely witnessed the successful result; but in the silent midnight, alone, in seclusion,—as if on mischief bent—with only the insignia of mortality and decay—the dreadful relics of the charnel-house—around him, see him, the devotee of medical science, pursue his labors and achieve his conquests, until he forged the chain of cause and effect, and man became to man anatomically an unveiled cosmos of wonders!

With the progress of anatomy came naturally a more rational comprehension of surgery, and the instinctive efforts which had been made from the beginning to relieve injuries and deformities, have culminated in the splendid achievements which year by year startle us by their daring success. By this are unmasked the concealed enemies which undermine the citadel

of life. "The burrowing antagonism is no longer permitted to do its deadly work in obscurity: but yielding to the surgeon's knife, it surrenders its secret to the light of day."

In the *materia medica* research has been untiring. Not a hillside or valley in the vast domain of this known world, not even the "isles of the sea," have escaped the vigilant eye of the searcher after nature's stores for the "healing of the nations." From the murmuring stream as it flows gently from the mountain-side, from the river and lake, from the bosom of the sea have been gathered herbs and remedies apparently created only for the purpose of bringing balm to the human frame in some imperilled hour. Following the lines of commerce and trade, and reaching far beyond the limits of civilization, with a courage and heroism unsurpassed but seldom appreciated, have been plucked some of our most valuable remedies.

Still in another direction has our profession accomplished much and made it tributary to the relief of suffering. The old speculations of alchemy, the infatuations after the "philosopher's stone," and the votaries of the elixir of life have passed away; but that which was useful has been incorporated into chemistry and pharmacy, and found a function under the fostering care of medicine. Not a rock or metal—scarcely an object connected with the inorganic world—has escaped the penetrating eye of some disciple of Esculapius. Not content with the analysis by which these bodies are reduced to their simple elements, he has, by some master-stroke, produced chemical compounds infinite in number and variety, and essential, not only in the arts but in their general relations to human life, and of therapeutic value.

As an element in society,—in its power and influence upon municipal and social progress—as an adjunct to the highest civilization in every department of physical, mental, and moral effort, no factor is so powerful as the significant warning of the faithful physician. The ministerial office, invested as it is with a superficial importance, and enveloped in the mental halo reflected from the unknown shores to which every soul is bound, fades and pales into insignificance before the uplifted index finger of him who has come, weary and dispirited, from

the conflict of the forces of right and wrong in the tortured body of some weak betrayer of the laws of nature. Polemical discussions, hair-drawn issues, involved and contradictory statement of faith! What are these in comparison with the warning call, "Be pure and temperate, be honest and just," from the bedside deserted, perhaps, by all save the one friend who *never* deserts *any* sufferer? Before such scenes he stands ennobled! He realizes, as no other can realize, the immutable fiat of the Almighty, "*Do right.*" And further, the influence of imperfect or mistaken *sanitation*, the laws of heredity, the contaminated and contaminating sources of our pauper population, idiocy and insanity; and following them, the general decline of mental vigor with its far-reaching results upon our population, the decay of moral fibre, and, as a consequence, the insecurity of our national honor—these, and an infinitude of greater or lesser evils, threatening our existence as individuals and as a nation, hang on the faithfulness of that sentinel who stands beside us as we enter upon existence; beside us through after years, in peril or prosperity, in joy or sorrow; and finally, when nature succumbs, fights the last battle for us with the king of terrors; and when his art fails, he soothes our exit and whispers hope and courage to the parting soul. It needs no proof to show how closely the physician who is worthy of the name stands related to benevolence. No family is so poor as to be placed beyond his sympathy and help. He does not stop to ask if the sufferer possesses moral desert—nay! Even if he is a criminal he hears his moans, and feels that to the lowest member of society life is dear. The church cannot say that the poor have the gospel preached to them; but all honor to our own brethren, who are ever ready to carry their learning and skill to homes from which no reward of service can ever come. How often, when bigotry and sectarianism have passed by on the other side, and charitable purposes been impeded by arbitrary rules, has the all-embracing philanthropy of the ideal doctor compassed the difficulties and brought relief! The ordinary lay mind is incapable, through ignorance of fundamental causes, rightly to estimate the conditions of public safety. Against the pestilential march of zymotic diseases, now so fearfully on the increase by reason of the accu-

mulation of vegetable and animal débris, by atmospheric and climatic changes, by promiscuous immigration, and other causes, our profession stands in opposing front, more effective in promoting the health and well-being of the nations, and of unifying the interests of mankind, than the standing armies which are the shame of modern times. These diseases which were formerly so formidable to the happiness of the race and so dreaded by the physician, are now largely held at bay. "Thus far and no farther" is the dictum of science in this regard, and all we ask is that its behests be heeded in sanitation and right living.

We do not deny that uncertainties still beset us. Life itself is a mystery, and as little as it is possible for us to comprehend the principle of life, so little is it possible for us to comprehend its antagonism, disease. So far, we are limited. Both lie far behind their manifestations to our senses, and probably never will come fully into the arena of human knowledge. As the mind looks out into the infinite and is lost in its immensity, so our understanding falls into confusion in any attempt to solve that which Deity has reserved to himself. But this admission does not debar the skilled scientist to interrogate the one phenomenon and to confront the other; and as we go on in our investigations here and abroad, more especially abroad from the nature of things, we reach conclusions which have already crowned the profession with honors more lasting than royal insignia. The strides made in the study of pathology have landed us far ahead in our conjectures of disease action. We do know definitely that disease is often a conflict of low life with high life. The spores of the meanest organism invade the divine body of man and overthrow the human giant, as the voice once ruined a city or as locusts tormented Egypt; in a few hours living germs can undermine the most perfect human frame and reduce its beauty to the dust. By means of our later researches we have partially mastered these foes, whether in the air or in the water or in the food essential to our existence.

The plague of London and of Constantinople, which in a year made the streets empty, was an invasion more terrible than that of any army that ever marched. With the safeguards of our science, if properly enforced, such an invasion

can never again occur; and as the nation thanks the army that fights for its liberties, so should justice be done to those who have fallen martyrs to scientific research in bacteriology and kindred lines of work. In a half century this work has added to American life about ten years. Last summer this country in certain sections might have been a vast hospital and graveyard had there not been those to interpose a timely defence in warning and equipment.

It may fairly be said that from this department, the department of sanitary science alone, more has been accomplished in the last few decades for the saving of a human life than has been accomplished in the sphere of death by all the machinations of war and civil destruction. In every city and town, from the hamlet on the hill to the metropolitan centers of wealth and culture and learning, gain has been made, and the most uninformed classes have been taught to see where immunity from loss and suffering lies. The time will come when this science of cleanliness, as it might be called, will be so systematized and controlled by governmental action as to surround the humblest as well as the highest citizen of the commonwealth with the sure success of protection. When this happens we will witness a "sanitary bureau," with its ramifications extending to all conditions and cases, just as they exist in other, and I will say *less important*, departments. The health of the people should be the first care of a paternal government, and until the full realization of this fact dawns upon our lawgivers, a great want will be present. The debased and disabled classes will continue to be on the increase. Institutions for their care and protection must be provided; the immense expense must be met, and the degradation of the nation in moral and mental vigor will continue to loosen the bands of integrity and true patriotism. Ample means should be within the reach of those who from the bent of their genius would devote themselves to special lines of study, and the public mind should be opened to the possibilities of acquiring such facts as lie within the compass of ordinary facilities.

I would suggest, as one of these fields for general observation and demonstration, the use and adaptation of the microscope. In a professional sense, this has been one of the triumphs of the

age. Not only in the study of the ultimate form of life-structure, elucidating the development cells, fibres, and tubules, which lie far beyond the power of human sight, but also in the study of morbid organic growths, morbid deposits, and the various morbid changes which are constantly occurring in the organs and tissues of the body, and beyond the body and the whole wide area included in bacteriology.

In these more or less obscure fields the power of self-sacrificing endeavor is specially shown, for the achievements made seldom reach the portals of common renown, frequently fail even of full success, but every effort brings somewhat nearer the final aim. It is comparatively easy to grapple with disease as it confronts us in tangible form, with certain well-known aspects and characteristics, which can be met with some degree of confident expectation; but a higher award belongs to those who with sublime devotion note the changes and fluctuations of the enemies entrenched in some perhaps inaccessible part of the body. Just here, in these marked diseases, such as the organic diseases of the kidneys and their relation to brain softening and other lesions of this supreme organ, in the concealed diseases of the heart, in a thousand other unthought of and unfelt dangers constantly threatening the hope of youth, the glory of age, and the peace and happiness of homes, does the votary of science, with the microscope in one hand and the spirit lamp and test tube in the other, stand with a godlike heroism for the deliverance of men. And yet the world knows little of it, and the rewards, beyond the inner consciousness of duty well done, very few.

With a knowledge almost prophetic he prepares against the dangers awaiting his patient, who may be all unconscious of his doom, or ameliorates his pangs as he nears the portals of dissolution.

The ravages of disease by reason of our artificial habits of living, the changes wrought by our wonderful activity, in the sphere of nature, in the earth's surface by the upheaving of the substrata of soil and the destruction of forests, thereby altering the constituent proportions of the air we breathe and the water we drink, in the intricate and multiform influences that bear upon the animal economy,—over these questions many a pro-

longed vigil is kept by the master-spirit who mounts guard while the dear, oblivious public sleeps in false security, or wakes to grumble at taxes required for its own hygienic deliverance. One of the most difficult duties that meets the physician is that of creating or moulding public opinion, and through it obtaining legal concessions for the better accomplishment of some of these purposes. From the very earliest times, the attitude which the public has maintained toward the science of medicine has been one which has not obtained in any other trade, calling, or profession. To be an authority, generally speaking, one must needs have had more than ordinary experience in the matter under discussion; but in the matters medical we frequently observe the humiliating spectacle that the assertions and suggestions of the most illiterate laymen carry equal weight with that of the most eminent medical authority. Many lives are lost through the ignorant advice of well-meaning friends, who have essayed the treatment of a serious case which would have been amenable to regular practice if left alone. So, also, in applying this interference to wider projects, we find the stupidity and ignorance of a community acting through its councils and petty officers, hampering and impeding every step taken toward sanitary reform. It has seemingly been an insuperable task to persuade the common mind that a scientific foundation exists for the regulations requiring sufferers from contagious diseases to be isolated and the affected premises disinfected, to the extent, if need be, of financial loss and deprivation to the victims.

A traditional faith in an overruling Providence to whose mandates all men must bow, together with an inherent belief that nature cannot so subvert its mission as to neglect our rescue, has done more to uphold quackery and medical, or healing, frauds than any one thing. There is a fascination about the phrase "nature's own remedy," which no amount of reason or logic can dispel. This accounts for the success of Paracelsus in the sixteenth century, who, casting aside all the accepted theories and precepts of medical knowledge, succeeded in obtaining a great following—especially for his "elixir of life"—which, however, failed of its virtues upon himself, he dying at the age of forty-eight years, and so per-

mitting the cycle of thought once again to return upon itself and seek more enduring bases. Many similar examples might be advanced to illustrate the ever-prevalent tendency to ignore the true spirit of investigation, but in the brief time at my disposal I need not quote what every reader of history has learned for himself. My object has been to show you how constantly honor is given where honor is not due, and true merit neglected or sunk out of sight by pecuniary considerations or personal preferment. You will have observed also that each one of these invasions of the realm of truth has been succeeded by a reactionary movement in the opposite direction, thus in the end acting as a stimulus to new discoveries and further progress.

This fact emphasizes the necessity of watching with vigilant interest the shifting currents of expressed opinion in the world of literature, of science, and of political action. The conservatism of popular belief holds thought down to a general level, and it needs vigorous movement at the periods of awakening to inaugurate reforms and establish enduring principles.

I believe that such a period is upon us now. The tide is rising, and if we would steer our craft into safe harbors for the future, we must be ready to act at the critical moment. Thus we should lose no time in seeking to strengthen the points we already hold. An era of marked progress is upon us. In sanitary reform, in the greater care given to the insane, in the sphere of social purity, vast interests are at stake, awaiting definite and concerted action from the body of humane and cultured men in our ranks.

Prevention rather than cure is the watchword of the modern scientist, and in pursuance of this maxim he requires, in addition to his personal equipment, the fullest recognition of his services, in honor and emolument equal at least to that accorded to any other servant of the state. Accordingly, as fast as it is possible to carry the load of *passive* or *indifferent* public sentiment which so retards progress, there should be a united movement on the part of the regular profession to demand greater concessions and a more dignified plane of action. While we do not assume absolutely to debar from practice those schools whose representatives swarm our path-

way (for the public loves to be gulled), we do ask not to be confounded with the modern presentment of ancient and moss-grown error, empiricism of science. The laws of our state should be so amended that no doubt could exist as to the relative status of physician and drug peddler, still less of that lower juggler who plays upon the fears and follies of poor human nature in the guise of clairvoyant or Christian scientist. In this regard we are far behind the European country. With us all is life and activity in the sphere of the practical. In Europe it is energy and indefatigable labor in the sphere of the intellectual, and though these are necessarily the complement, the one to the other, a higher order of subjective development in our professional life is now essential to our true destiny.

This want is felt on every hand, and in imitation of our trans-Atlantic brethren, efforts have been made, and are still in progress, to elevate the dignity of the profession on the one hand, and protect the people on the other, by means of legislative enactment.

"I have but one lamp," says Patrick Henry, "by which my feet are guided, and that is the lamp of experience." In the light of this experience, especially as measured by the last decade, there is awaiting us a glorious future. In the light of what has been accomplished up to the present, the hour must come when all theories shall have resolved themselves into facts, and when all principles shall no longer savor of doubt or uncertainty, but when the nature and character of diseased action shall lead to interpretation infallible as truth itself. As auxiliary to this, the implements, so to speak, of our practice—the speculum, the opthalmoscope—the high grade instruments and antiseptic precautions bear an important part, and in order fully to include these various bearings, it is of the first importance to demand of the candidate for professional honors a thorough preparation in education. The time has gone by when a man can be called from the plow and the anvil, without any special intellectual training, to take charge of the gravest responsibilities that can fall into the hands of man. For such a task all learning is befitting. All the sciences are blended in that which we call medical science. To comprehend the rela-

tions of each to the human frame, and to command their resources, is not work for the intellectual tyro. So long as our schools throw open their doors to the student, requiring little general qualifications so long as a thorough literary, classical, and scientific education is not absolute, so long is it useless to ask the state to do for us what we are not doing for ourselves. In the sphere of true attainment we stand pre-eminently above law, theology, and philosophy. With science there are no cycles of repetition; no stagnant pools where life and energy sink into indifference; no metaphysical idealism; but its life is the law of necessity, and its theatre the province of facts. Therefore, it is not only necessary that the physician should think, but equally that he shall know how to think. Not only necessary that his mind be stored with the facts and principles of the profession, but how to apply them to a particular case. Not only how to know, but how to judge of effect. His science bears upon the culprit before the bar, upon the day-old infant in its mother's arms, upon every interest that can affect the human race: how then can such a charge be given recklessly to an imperfectly taught and irresponsible person?

Just so soon as the world sees that the profession is consistent with its pretensions; when our schools shall have adopted some creditable standard of scholarship; when by our testimonies the world has learned that the highest order of intelligence is necessary for the high and noble functions we claim, then will legislation ask to join hands with us and help us to fulfill our noble destiny as saviors of the race.

> "And God be thanked that many to this end
> Are working, by the unfaithful and inert
> Derided, not defeated, and though faint, pursuing.
>
> "Who lift the valleys even with the hills,
> And on a secret anvil, hour by hour,
> Unforge the fetters of humanity."

THE PREVENTION OF COMMUNICABLE DISEASES.

BY D. EDWARD SULLIVAN, M. D., CONCORD.

"The death most to fear
Is the death we least dream of."—*Horace.*

The superstition and ignorance of the plagues and pestilences of mediæval days have been dispelled by the revelations of brain and microscope of the nineteenth century. A new day has dawned. The horizon is brightened with the effulgence of the radiant sun. May its moon never rise! Earth rejoices, and its inhabitants are exceeding glad. The Biblical allotment to man of three score and ten years has been verified—life is regenerated. Tuberculosis is strangled in its very stronghold; no more shall grim cholera, death-bearing, wing its flight over the civilized world; diphtheria acknowledges Herod its superior in youthful destruction; scarlatina, with its lengthy train of gloomy attendants, has lost its mission; typhoid fever has been relegated to history. Roseate as this may seem, it is, nevertheless, practicable and accomplishable, but only by unremitting, unselfish, intelligent industry. The physician of to-day is not a mere dispenser of pills and potions, an authority on tongue and pulse, but is the one to whom state and citizen look for counsel in many an emergency. If a school-house is to be constructed, an epidemic to be averted, a water-shed to be protected, a sewer extended, a gas-plant investigated, his opinion is generally sought and highly prized. Our responsibility then, both to ourselves and the public, is beyond measure, and particularly so in its bearings on the subject under consideration. If we in our daily practice regarded every case of communicable disease as due to criminal causes, and every death resulting as murder,

for which some one was responsible, we would better appreciate the importance of contagion and infection. A full sense of its importance never will be attained until our medical colleges put these diseases on an equal footing with others. When the surgeon-editor, Shrady, is compelled to have his first case of measles diagnosticated for him by a washerwoman, a sad commentary is offered to our medical instruction. How many of us ever saw a case of measles during our studies prior to graduation? With the curriculum of many of our medical seats of learning lengthened to four years, comes the realization of our past neglect in sanitary matters. The medicine of to-day is preventive medicine, and it marks an epoch whose possibilities are limitless; the discovery of the toxines, and the immunity granted the system by the anti-toxines in certain diseases, open up a mine for future exploration in which the searchers for knowledge must be workers. In "thoughts that run and words that burn" must the graduate leave his *alma mater*, knowing the whole value of "an ounce of prevention." Only by having a professor equal in ability to his colleagues, with compulsory attendance on his lectures, and a satisfactory examination at their completion, can this be obtained. The greatest want in student life is clinical knowledge of the exanthemata and diphtheria, and students in our large cities should demand the opportunity to perfect themselves. This lack of early training is, to my mind, the great reason that physicians are so indifferent (shall I say ignorant?) in advising the public, and explains much of the conflicting experiences between them and the local boards of health. The physician will report a case of diphtheria, and in three days ask to have the card removed from the house, as the child is better; the board says isolate for three weeks. Here is a decided difference of opinion, and sanitary improvement is badly damaged. Then he may say to the family, "There is no danger of spreading the disease; no reason why your house should not be disinfected and you go to your ordinary business." Public opinion is most necessary to establish and maintain any law; and the very man who can mould that force aright is—maybe unwittingly—solidifying it in the wrong. The people are willing to bear privation if they can be shown that it is for their own benefit and the welfare of

the community at large, but are restless under divided professional advice. We should not be obliged to contend with internal warfare—our co-workers should be our heavy artillery. A special rule cannot be made for every case. If some suffer under the workings of a general rule, it is far better than to feel that through laxity of regulations an epidemic has passed beyond control. Here I believe in centralization of power. Let the board of health be sole judge, and let the medical attendants give it their hearty coöperation. If this be accomplished, the first and greatest impediment has been removed.

EDUCATE THE PUBLIC.

The time will come, and in a few years I trust, when simple instruction in plain words will be given in our public schools, teaching our young boys and girls the meaning of contagion and infection, and the absolute impossibility of contracting some diseases without coming in contact with their specific organism, and explaining to them the reason of isolation and disinfection. Until the youth is educated we must disseminate information to the public in circulars, telling them the nature and causes of these diseases, and the precautions necessary; citing instances at home to show how they are spread, and proving that if the first case be thoroughly isolated there will be no second. Use the press freely; there is no better way to reach the eye of the people. Court its favor; its aid is most potent. Show to your city government the saving to it, in restricting sickness and saving life, by having a hospital set apart for the treatment of contagious diseases. Such an institution is well-nigh indispensable to every city in this state. There the strict isolation and quarantine of sufficiently long duration could be effectually carried out, and without this we can never hope to accomplish much.

SCHOOLS.

Deficient sunlight, bad ventilation, long hours of confinement, oftentimes found in schools, all tending to devitalize the system and make scholars easy victims to disease, coupled with the intimate intermingling at recreation and the close associa-

tion during studies, undoubtedly make schools hot-beds for the propagation of germs. Many abuses and defects now existing, and serving as carriers of infection, might be remedied did we as physicians take a proper interest in them. How rare to find our profession duly represented on the school board in the cities; and yet what a tower of strength it would be! Do we even show any particular concern about the street department, the water board, park commissioners, or school supervisors? If the air be poisoned by sewer gas in tearing up streets, our drinking-water polluted *ad nauseam*, insufficient breathing-places provided for the people, and consumptives graduated from our schools, are we not at fault in our indifference? With very few exceptions, the law compelling children to be vaccinated before admission to school has been most loosely observed; to us, who know the value of the discovery of the immortal Jenner, it is an unpardonable abuse of gifts. The enforcement of the law should be vested in the boards of health, and should embrace all schools and teachers. There should be kept in the school a record certifying to the vaccination. Teachers should be trained to watch for the premonitory symptoms and early indications of communicable diseases, and instructed, when they thought necessary, to send pupils home for medical examination. Shall pupils with pulmonary tuberculosis be allowed to continue at school? This question forces itself upon us, and, in the light of recent developments, would seem to demand a negative answer. If the school authorities were always informed of the presence and locality of contagious diseases, they might do much, by working in unison with the health officers, to limit their spread. The Concord board of health, in its report for 1893, recommended that a pupil, after suffering from small-pox, scarlet-fever, diphtheria, measles, or whooping-cough, shall not be allowed to return to school except on a certificate from the board of health that he has lost all power to communicate the disease, and that all infected articles have been disinfected to its satisfaction; or, after exposure to such diseases, shall not return to school except on a certificate from the board that the period of incubation belonging to the disease to which he has been exposed has passed. The regulations of the Pennsylvania

state board of health give the following as the length of quarantine for school-children exposed to infection: Diphtheria, twelve days; scarlet-fever, fourteen days; measles, eighteen days; whooping-cough, twenty-one days.

DRINKING-WATER.

All must acknowledge the efficient propagation of typhoid fever by drinking-water, and yet the dejecta of typhoid patients are at times allowed, undisinfected, to swell the volume of somebody's water-supply. Better drink of the Ganges, teeming with the putrescence of sacrificial filth offered to the Hindoo god, than partake of such. Am I my brother's keeper? Shall we be branded with the curse of the Great Physician and man for wanton neglect in these cases? The great cry of to-day is, "Purify our water!" and shall we be deaf to the entreaty? Too much exactness cannot be required in the selection, examination, and protection of an article so universally used in such large quantities; the source and its surroundings, the opportunities for pollution, the water itself, the character of pipes used in its distribution, all necessitate extraordinary care. Impure water, even if it contain no specific germs, invites communicable diseases by rendering the system more vulnerable. London and Berlin, using filtered water, show the remarkably low death-rate from typhoid fever of .49 per cent. and .42 per cent., respectively, to their total death-rate. On the other hand, Chicago, drinking diluted sewerage a few years ago, had from this disease a death-rate of 6.72 per cent. to its total. Comment is unnecessary. The success of the filtering station at Lawrence, Mass., has proven that 99 per cent. of bacteria can be removed by that process. Whenever there is a doubt as to the purity of drinking-water, it is certainly advisable to have it boiled before using.

INSPECTION OF PLUMBING.

The time has come when we should demand of our legislature a law requiring the inspection of plumbing. Until a general law is enacted, our cities should invoke local legislation giving them protection in this matter; and, as physicians,

we should lead, not follow. The public now fully understands the worth of approved work, and realizes the dangers of defective work. Much of the so-called sanitary plumbing will not stand ordinary tests, and our health and lives are jeopardized thereby. Sewer gas, loaded with specific germs, has been the cause of diphtheria in many families, and oftentimes an obscure illness, if traced to its proper source, would be found due to imperfect pipes or unventilated traps. Let us see to it that, insomuch that scientific workmanship can provide, no home will be in grief or mourning because of this subtle, deadly poison.

EFFICIENT ISOLATION.

One of the most common mediums through which these affections are transmitted is the inefficiency of isolation. Some physicians are inclined, perhaps against their better judgment, to release their patients before the danger of communicability is past. Considerations of a personal or family nature should not allow a doctor, responsible to the public for the results of his acts, to be influenced in his determination; yet new cases often arise from these very causes. As bearing on the period of infectiousness, I shall quote some authorities. The Paris Academy of Medicine says,—"For small-pox, scarlet-fever, measles, and diphtheria, isolation should not be shorter than forty days." The American Public Health Association, through a special committee, reports,—"The affected individuals [*i. e.*, in diphtheria] should be kept strictly isolated for not less than four weeks after the disappearance of all traces of the membrane." The New Hampshire state board of health advises isolation of scarlatina for forty days. Dr. Ransome, Owens college, Manchester, Eng., from researches, says,—"Measles are infectious before eruption appears, and communicable for thirty-one days after infection; scarlatina, in some cases, communicable before eruption and for six weeks after; diphtheria, infectious from receipt of poison until complete recovery, in ordinary cases thirty-three days." The Pennsylvania state board of health for 1890 reports the period during which a person who has had diphtheria is in danger of conveying the contagion, to be four to six weeks. Medical officers of Schools'

association, of England, say,—"Scarlet-fever, not less than six weeks; measles, not less than three weeks, if desquamation has ceased; pertussis, six weeks, if cough has stopped; diphtheria, not less than three weeks, if all discharge has ceased," as the time of safety in returning to school after suffering from these diseases. Dr. Herman Biggs, pathologist to the New York city board of health, found bacilli Loeffler in three cases five weeks after exudate had completely disappeared from the throat, and in another case, no membrane in the throat, found the bacilli in nasal discharges five weeks after apparent health. Thereupon a rule was adopted to continue isolation until examination showed absence of the bacilli. Where it is possible, every local board of health in this state should have a pathologist, and be guided by this action of the New York city board. Why is there not something done to restrain the ravages of whooping-cough? Is it more harmless than measles? Last year Concord had a widespread epidemic of measles, without a death in more than four hundred cases. With a much smaller number of cases of whooping-cough, she had four deaths directly due to it, and others, maybe, indirectly caused by it. Let us put this disease in the list of those reported; and by instructions to health officers, and advice to the public, do all we can to check its spread.

ORGANIZATION.

The very commendable efforts now being made to establish some central national health bureau, co-equal with the other departments serving as advisors to the president, should receive our substantial support. Why the government should not be as interested in saving life as in destroying it, is difficult to comprehend. We spend fabulous sums of money in maintaining our army and navy, but comparatively little in instructing the people how to live better and longer. Are we interested enough to know how our own senators and representatives at Washington are on this question? A state association, composed of the past and present members of the local boards of health, is greatly to be desired. At their quarterly meetings timely topics could be discussed, mutual encouragement given

and received; and the public, when advisable, informed of their doings through the press. Much good would inevitably come from such an organization, and the general information on sanitary matters increased. Without an active, energetic, up-to-date local board, you cannot do much. If there be no board, let the doctor constitute himself health officer, and see that all precautions are observed. Heartily coöperate with the authorities in the exercise of their powers, and feel that you are morally bound to make to them any suggestions you deem of benefit.

TUBERCULOSIS.

Hydra-headed tuberculosis, in its Protean forms, annually drags numberless victims at its chariot wheels. Under its baneful leadership follow the very flower and youth of the nation, galloping in their hectic career until they surrender to the mighty conqueror. Who can properly estimate the loss to home and country of this immense army scarcely placed on the field of active engagement? All will admit its infectiousness, and the imperative need of prompt action. The people must be told in no uncertain tone that it is not hereditary, that it is caused by a vegetable micro-organism and is preventable; that just as they violate the laws of nature, depress their physical resistance, and breathe in bacilli tuberculosis, are they liable to die of consumption, even if no one in their family ever died of it. Cases should be reported to the board of health, not to have the house placarded, but to give the sufferer and his companions the benefit of scientific knowledge on the subject; to warn others of the danger of contracting it; to demand a disinfection of sputa; an abundance of sunlight and fresh air; an inspection of the house, to determine the condition of cellar, soil, and surroundings. Statistics thus obtained cannot fail to be of great benefit in limiting the number of cases. When ten per cent. of our population are annually dying of tuberculosis, can we do too much to lessen it? Milk may be the source of more diphtheria, scarlet-fever, typhoid fever, and tuberculosis, than we dream of; and, to guard against this danger, milk venders should be licensed, their dairies inspected, cows examined, and any case of sickness

occurring in their families reported at once to the health officer. If death follows in any tubercular case, the house should be disinfected as in other infectious diseases.

DISPOSAL OF THE DEAD.

Unfortunately, the evil that many communicable diseases do lives after them; so, in death, as in life, must vigilance be practised to escape their dangers. For this reason alone, if for no other, should undertakers be under the supervision of the health department, and compelled to report to it at once every death from a contagious or infectious disease, and all others within twenty-four hours following death. Recently I signed a death certificate nine days after the death, and seven days after the burial of the person. The practice of indiscriminate disinterment of those dead of contagious diseases, and the keeping of such bodies in the same tomb with other bodies through the winter months, is fraught with peril, and should not be tolerated in an enlightened age. Whether cremation, the annihilator of all germs, shall supplant the present mode of disposing of the dead, rests largely in our hands. Many epidemics of deadly diseases have been traced to burial grounds, and the necessity of a change may some day be imperative. No body should be disinterred without a written permit from the board of health; and, if immediate burial of those dead of contagious diseases cannot be secured, a separate tomb ought to be provided for them. When private funerals are ordered there is now no difficulty in obtaining them; but if the body is to be sent to another town for burial, see that every requirement is fulfilled. It may yet be necessary to forbid the transportation of a body liable to transmit disease outside of the jurisdiction of the town where death occurred.

IN CONCLUSION.

Something must be done to lessen the danger of infection in travelling. Passenger cars and steamboats should, by law, be required to undergo a complete cleansing after each trip, and at frequent regular intervals be disinfected by the fumes of sulphur, or by steam under pressure. Any person known to be

suffering from a contagious disease, or any articles infected from such, should not be moved in any public or private conveyance, except under the supervision of the health department. The state board of health should be empowered to appoint local boards in the towns. The efficacy and necessity of re-vaccination should be given more publicity. The worth of disinfecting inunctions of the body in the exanthemata should be borne in mind, as should also the futility of incomplete general disinfection. Not only must the body of the sick, but everything in the room—the walls, woodwork, carpet, clothing, and furniture—be subjected to a thorough purification. To have our plans carried to a successful issue money is required, and the legislature and city governments ought to be shown wherein we are hampered by lack of funds. Much good has been done, but very much more remains undone because of the insufficiency of appropriations. Let us be explicit, and point out to them what should be done, and how it may be done to the best advantage. With a little effort I believe it could be satisfactorily proven that it is as wise and necessary to maintain an efficient health department to protect our lives as it is to provide an active fire department to guard our property.

This paper has been purposely confined to the discussion of such parts of its subject as seemed most interesting to you as physicians of New Hampshire, and for that reason, has not touched on many points that have been suggested. The subject is replete with interest, and must command much thought from the progressive men of the present age. Under the benign influence of preventive medicine, statesmen will see more contentment, less strife, better morals, happier homes, and purer laws; scientists will develop the wonderful works of creation, and reveal to our clouded minds many things now obscure; political economists, realizing that money even lavishly expended that good may come to all is not profligacy, may work out in cold figures the saving to their governments in sickness averted, lives lengthened, and deaths frustrated; and the whole world, thrice blest, will, in dying salute the goddess Hygeia for her many benedictions.

Dr. Child, of New Hampton.—*Mr. President and Members:* One thing is pretty sure, there can be no more important subject, no more useful paper presented, than the paper that has just been read. I do not think that I can really add anything to the ideas here expressed. If I should take up any one point it would be the matter of education. We are all satisfied of the importance, that is, we, as physicians, are satisfied, of the importance of the subject. We know that certain diseases may be, can be, will be, and are, every day, communicated from one diseased person to another person who is in health.

The particulars of any one disease, I do n't know that it is of any use for me to attempt to discuss. In regard to the matter of measles, I think the point suggested there is a very good one. We have been apt to consider measles as a very mild disease, to be doctored by old women. And yet I know of two serious cases—one patient died about three months ago. The other certainly, or perhaps, will die, who had the measles over three years ago. I have not the least doubt that the condition of that case is the result of the measles. It is just as much our duty to watch cases of measles, as of scarlatina, small-pox, or any of the more contagious diseases, for the reason that some years measles will be very malignant, that is to say, there will be some few malignant cases, and we do n't know when they are coming. The good Lord has not communicated to us all the knowledge yet that we need to make very successful physicians, and so we must be constantly on the watch and always ready to apply the most careful treatment. Many a family has lost some one of its members simply because the physician has not been quite up to the mark in informing them of their danger. I have in mind two or three cases; but it would be useless for me to give an account of them now.

Now, as to the matter of education, and the matter of physicians having authority, I think that one point should be more carefully considered than it has been in the paper. Physicians ought to give the people information in regard to these matters. There has been a strange idea abroad for hundreds of years, that disease all came down from our ancestry. A few

years ago I had the temerity to suggest in this society that all disease was not inherited—that tuberculosis was not. And I am thankful to Dr. Sullivan that he has taken a step in the right direction; and if I hold out a while I shall see every man in this house agree that tuberculosis is just as much a disease communicable from one person to another as is small-pox, or any other kind of pox. This is a matter we ought to inform people upon. I do not care whether my mother, grandmother, or great-grandmother had consumption, except that it may indicate in me a tendency to that disease; but I do want to know whether the people with whom I am associated every day have tuberculosis. I have a record of more than ten cases since our meeting two years ago, which I would like to report at some future time. One of them I have seen this morning. Four years ago that man was a nurse and close associate of a young man who had tuberculosis, and although he has been to Colorado, and been operated upon in Boston, and gone through all the other performances, there tuberculosis is to-day, and he is ready to communicate it to anybody else that associates closely with him. I consider this one of the most important matters, because the disease is so subtle in its nature, and so prolonged in its action, and we never know just where, when, nor how, we come under its influence. If I have ever given any attention to any branch of medicine it has been to this subject. I had a favorite sister who went down into a consumptive's grave more than twelve years ago, simply because for three months she took care of a friend who had consumption.

I think a point has not been mentioned in the paper in regard to using disinfectants in these diseases. Now, it seems to me that it is of very little account, and I am glad he did not mention it, or if he did I did not get it. I do not believe that that method of treatment of these diseases that can be communicated, is of any practical account. Of course, theoretically, it is nice to wrap a body in all kinds of disinfectants, even corrosive sublimate in solution. Is it not far better to bury such a body entirely away from human beings, or burn it? If there is a fatal case of small-pox in this town, I do not know why, under the direction of the board of health, the

body may not be taken when dead, taken with due reverence for the feelings of people, and burned and utterly destroyed.

I am tempted to carry this a little further. I am not sure that we should not make some law in regard to syphilis. I know it is a delicate subject to talk upon. Wiser men than I ever expect to be have talked and written about it for years. But if we are to prevent faces losing their noses, and prevent a large number of cancers, which are nothing more than syphilis, we must study and act upon this subject. I hope Dr. Sullivan will make an investigation, and when he is called upon to read another paper, it will be devoted to this subject, which is of so much importance to our larger cities—of *course* there is nothing of the kind in Concord. These cases ought to be taken in hand. If a man is faithless in every respect to himself and to his family, is a debauched man, I do not know why we should allow him to have free course and run where he wills; or such women, any more than we do men, who have the small-pox or chicken-pox, or measles, or any trouble of that kind.

I wish some one in discussing this question would give their ideas on the matter. I think we have got to get hold of this end of the subject right away. It is necessary. [Applause.]

HYPERTROPHIC AND ATROPHIC RHINITIS.

(Chronic Nasal Catarrh.)

THEIR PATHOLOGY AND METHODS OF TREATMENT, WITH SPECIAL REFERENCE TO THE WORK OF THE GENERAL PRACTITIONER.

BY ALBERT PICK, M. D., BOSTON, MASS.

A large number of physicians exhibit indifference as regards the study of the pathology of the nasal and naso-pharyngeal structures, the technique of examination for the purpose of making a proper diagnosis, and the advanced methods of treatment of their diseases.

Considering the frequent occurrence of nasal or naso-pharyngeal malformations and diseases, which in the majority of cases cause the afflicted individual quite an amount of distress, and which could be easily corrected and cured, if they would be recognized by the physician who is consulted for the relief of certain direct or indirect symptoms arising therefrom, such a state of indifference on the part of a number of physicians is hardly justifiable.

I shall principally confine myself here to the two affections which are the most frequent in occurrence, very distressing to the patient, and can be most easily recognized and treated, viz., *hypertrophic* and *atrophic rhinitis*, or, as they are often called in short, *chronic nasal catarrh.*

As a rule the nose is regarded, as fittingly described by Dr. E. J. Benningham, of Brooklyn (*vide New York Medical Journal*, 1, 1893), as the organ of smell and catarrh. It is, also, known that it is at times subject to polypoid growths, and

the like. A patient suffering from one kind or another of nasal or naso-pharyngeal trouble is, usually, without any attempts at an examination, advised to use salt and water, to be sniffed up or to be used by means of the nasal douche. Sometimes he is given some powder to be snuffed or some ointment to be applied into the anterior nases. There are also cases on record where patients have been advised to avoid a specialist, that catarrh is inevitable in such a climate as ours, and the like.

Now some will think these statements exaggerated. To show, however, that this is not at all the case I simply ask, *how many physicians make a thorough anterior and posterior rhinescopic examination* in patients with nasal troubles who apply to them for treatment, either for the primary nasal affection or disturbances depending directly or indirectly on them?

In order to treat a nasal or naso-pharyngeal affection successfully it must be properly diagnosed. To diagnose a vaginal, uterine, rectal, or cardiac disease we have to make a thorough examination of the parts with the proper instruments. The same procedure is, therefore, necessary in attempting to make out any pathological process in the nose or naso-pharnyx; and such an examination is the more important here, because we cannot gain much information by our sense of touch.

It would, therefore, be desirable that every physician should be familiar with *anterior* and *posterior rhinoscopy*. It only requires a few inexpensive instruments and a few weeks of practice. A thorough examination of the nose and naso-pharnyx could then be made in every case; a deflected septum, hypertrophied turbinated bodies, adenoid vegetations, exostoses, polypi, euchondromata, etc., etc., could be promptly recognized and referred to a rhinologist; who, after having restored the normal calibres of the nasal fossæ, could refer the case back to the corresponding physician for further proper treatment. Many a patient would thus be afforded prompter relief, and physicians would not be obliged to feel embarrassed, after their patients have consulted a rhinologist on their own account, and have been told that some of the above mentioned pathological conditions of the mucous, cartilaginous, or bony structures of the nose or naso-pharnyx were the cause of all their trouble, and which had never been recognized by them.

HYPERTROPHIC RHINITIS.

This affection is also known under the terms of hypertrophy of the turbinated bones or bodies, hypertrophic nasal catarrh, and hypertrophic ozœna.

It constitutes an hypertrophy of the nasal mucous membrane—the result of chronic congestion, accompanying frequent attacks of *acute* or an existing *chronic* rhinitis. The development of an hypertrophic rhinitis is often aided and hastened by the employment of improper methods of treatment of cases of simple chronic nasal catarrh; e. g., the use of irritating snuffs, strong solutions of astringents; especially of nitrate of silver, and too frequent and too forcible application of the douche or similar apparatus. In a few cases it seems to arise idiopathically—like other hypertrophis.

The seat of predilection of the pathological changes occurring in hypertrophic rhinitis is the turbinated bodies, their peculiar anatomical structure especially favoring the development of superabundant tissue.

To demonstrate the hypertrophic changes there clearly, it will be well to review briefly the anatomy of these parts.

The turbinated bodies consist of the turbinated bones covered by their mucous membrane and epithelium. The mucous membrane is very richly supplied with blood-vessels, especially with veins, and is quite elastic. It, therefore, has erectible qualities, and together with the sub-mucous layers of tissues forms veritable *corpora cavernosa*—becoming erect, when filled with blood, and collapsing after being emptied.

The walls of these minute venous sinuses become thickened through hypertrophy, and lose their elasticity. Beneath the mucous membrane a hyperplasia of connective tissue takes place. We have now an increased amount of tissues *beneath* the mucous membrane; the mucous membrane itself becomes thickened, and the network of minute venous sinuses having lost their elasticity remain distended. We have now a pathological condition, which is termed *hypertrophic rhinitis*. Very frequently the septum also participates in these changes, as regards its mucous membrane. The hypertrophic state is, as a rule, unequally distributed over the surface of the turbinated bodies and septum, giving the surface of these structures an uneven outline.

Hypertrophic conditions in the anterior portion of the nose are called *anterior hypertrophies*—those in the posterior portion, *posterior hypertrophies*.

In cases where the turbinated bodies and the septum, in their posterior portions, are involved, entire stenosis of the nasal canal of one or both sides may result.

Hypertrophic changes in the nose, as a rule, progress slowly. Therefore it is important to treat properly and promptly a simple chronic rhinitis, before it reaches a state of hypertrophy.

The most important symptom complained of by the patient is obstruction in nasal respiration through one or both nares. The hypertrophied mucous membrane is more sensitive to atmospheric and other mechanical or irritative influences. The erectile part of the turbinated bodies cannot as readily or, at times, not at all, collapse, and as a result, distended with blood together with the sub-mucous hyperplastic tissue, they occlude one or both nasal cavities.

If this condition is of a severe degree and constant, the patient requires the habit of breathing through the mouth.

The physiological functions of the nose, to warm and purify the inspired air is thus suspended. This may be, and is often, the starting point of pharyngeal, laryngeal, and pulmonary affections. The voice acquires a so-called "nasal twang" from interference with the nasal resonance. The face often exhibits an air of stupidity on account of the constantly open mouth. The openings of the tear-ducts and eustachian tubes may, also, be occluded; thus causing trouble in the eye or ear. The sense of smell is impaired. Periodical frontal and supra-orbital headaches are often complained of. The nasal secretion is increased, often of a yellow color and thick consistency, mixed with scales, and of a peculiar, disagreeable odor, which latter, also, taints the breath of the patient. The increased secretions which cannot find a sufficient outlet by the anterior nares flow back and down through the posterior nares, irritating the pharnyx and larnyx, producing a continuous hawking.

Viewed by anterior rhinoscopy, the mucous membrane of the anterior portions of the septum, and of the inferior turbinated bones, is either seen to be of normal color or reddened. The enlarged inferior turbinated, and a part of the middle turbinated,

bodies can be seen to reach into the lumen of the nasal canal, at times only slightly, at other times more, until, in extreme cases, it will be seen to approach the septum, inducing complete stenosis. The middle and superior turbinated can, as a rule, only be examined by means of *posterior* rhinoscopy. The hypertrophied turbinated bodies may, also, be of a purplish or whitish polypoid degeneration. Their consistency, etc., may easily be determined by touching them gently with a probe. They bleed very easily.

Cartilagineous or bony spurs of the septum and hypertrophy of the glandular tissue of the vault of the pharnyx (adenoid vegetations) often accompany hypertrophic rhinitis.

Now as to the treatment of hypertrophic rhinitis. Cleanliness is the foundation upon which rests all success in modern medicine and surgery. It is, also, of paramount importance in any and all methods of treatment of the affection under consideration.

The surface of the lining mucous membrane of the nose and naso-pharynx must be thoroughly cleansed of the mucus, mucopus, and scales which continuously collect on it in this affection. No application, antiseptic, astringent, or otherwise, can be of any use unless it be applied to a perfectly clean mucous membrane. Which is the best way of cleansing the mucous membrane of the nose in hypertrophic nasal catarrh?

All douches, syringes, atomizers, etc., which place the force of the stream under the control of the patient, are to be abandoned. They will do a great deal of harm. A simple douche, which makes the solution flow in and out slowly and *without any force*, is to be selected. These indications are best met by Dr. E. J. Bermingham's douche.[1] He gives (loc. cit.) the following directions for its use: "Having warmed the cleansing solution by placing an ounce vial containing it standing in a tumblerful of hot water for a few minutes, fill the douche, which has a capacity of about seven drachms, generally enough for a thorough cleansing. The funnel should now be closed with the tip of the index finger, and the nozzle inserted into the nostril so that it closes the latter completely. Throw the head

[1] Made by Kress & Owen, 354 Pearl street, New York city.

slightly backward, raise the finger closing the funnel, and allow the solution to enter the nostril and flow through it to the throat. When the solution is felt in the throat the flow may be checked by simply closing the funnel with the finger tip. The solution should be kept in contact with the parts for two minutes before clearing nose and throat, and it should be used in each nostril. Breathe through the mouth while using douche."

Any other apparatus which throws any solution into the nose with force will by stimulation increase the hypertrophy, and may also cause serious trouble in the ear through forcible entrance of fluid into the middle ear by the pharyngeal opening of the Eustachian tubes.

The cleansing solution itself should be alkaline, antiseptic, and deodorizing. It should, preferably, be used warm. A simple and effective solution is the following: ℞ bicarb. soda., gr. xxx, listerin. ʒss., aquae, q. s. ad ʒiv. Seiler's alkaline and antiseptic tablets are very convenient to use. Formula: Sod. bicarb., borax, benzoate of sod., salicylate of sod., encalyptol, thymol, menthol, oil of wintergreen. A fresh solution can always and readily be prepared. One tablet dissolved in two ounces of water is the proper solution. It may be made stronger or weaker. The nasal cavities should be washed out at least three times a day; more frequently, if necessary.[1]

This treatment alone, if carried out conscientiously, will in many cases of simple chronic rhinitis or in cases of slight hypertrophic conditions yield very satisfactory results. Cases which present considerable hypertrophy of the turbinated bodies and the septum, adenoid vegetations, septal bony or cartilaginous spurs, or a considerably deflected septum, should as soon as recognized be transferred to a competent rhinologist for operative treatment, who will restore the normal calibre of the nasal fossæ, and then may refer back the case to the corresponding physician for further antiseptic, astringent, or other treatment, as the case may demand.

The pathological conditions referred to in hypertrophic

[1] Kress & Owen, of New York city, also manufacture glyco-thermol, the formula of which is similar to that of Seiler's tablets, with glycerine and other solvents. Dr. Bermingham speaks in high terms of it.

rhinitis are, as a rule, remedied in the following operative manner by the rhinologist:

Hypertrophy of the turbinated bodies are made to shrink by the application of chromic, nitric, or glacial acetic acid, by the application of the thermo-cautery; or if of a soft polypoid degeneration, they are removed by the cold wire or thermo-cautery snare, as is also done with polypi.

Bony or cartilaginous spurs of the septum are removed by the nasal saw, by burs and electric motor, or by an extra strong probe-pointed bistoury.

Deviated nasal septa are straightened by the various methods, best suited to the individual cases, which are at present in vogue in nasal surgery.

Adenoid vegetations in the vault of the pharynx are removed either by post-nasal cutting forceps, or by the more radical and more satisfactory measure, the sharp post-nasal curette.

Any constitutional disturbance (anæmia, scrofulosis, constipation, etc.) must of course be met by the appropriate internal remedies. Faulty hygienic conditions, also, should claim our attention.

If hypertrophic rhinitis is in due time properly treated by the medical and surgical means referred to above, the majority of cases, no matter how severe, will improve greatly or be cured. It requires, to accomplish these satisfactory results, perseverance on the part of the physician as well as the patient.

Cases of hypertrophic rhinitis which are either improperly treated or left to themselves will sometimes undergo involution during general senile atrophy, remain stationary for life, or frequently merge into this most disagreeable nasal affection known as

ATROPHIC RHINITIS.

(Dry Catarrh, Atrophic Catarrh, Fetid Catarrh, Ozœna.)

We mean by this term, atrophy of the mucous membrane of the nasal fossæ.

Other etiological factors besides hypertrophic rhinitis are dry and hot atmosphere, inhalation of tobacco or other smokes, and any other causes favoring accumulation and dessication of the natural discharges.

This affection may be unilateral or bilateral.

When *atrophic* rhinitis occurs as a result of hypertrophic rhinitis, the pressure exerted by the adventitious cellular tissue upon the glands and blood-vessels causes interference with or destruction of the former, and gradual absorption of the latter. As the destruction of the glandular elements progresses, the surface of the membrane becomes more and more deprived of the lubricating action of its secretion, and is thus exposed to the direct action of the irritating agents which now remain in contact with it. As a consequence, superficial dessication occurs, pressure is exerted upon the layers beneath, and this, coupled with the diminished nutrition occurring as a result of the decreased blood-supply, sooner or later produces absorption of the greater part of the membrane, including the corpora cavernosa, and frequently the turbinated bones.

Those glands which are principally affected by the external irritant become engorged, and their apertures are the seat of minute abscesses. Owing to their great number and close proximity, the latter form suppurative areas over which the purulent discharges accumulate into masses more or less thick. The contact of these masses soon destroys the underlying ciliated epithelium, the cells of which are shed abundantly, and the discharges not being softened by mucus or propelled by the to-and-fro motion of the cilia, remain over the seat of their production to become dry and decomposed crusts, by the evaporation of their watery constituents until they are of sufficient thickness to be loosened by the exhaled current of air and discharged. (Sajous).

The symptoms of atrophic rhinitis are, as regards any inconvenience or pain on the part of the patient, in most cases, negative; nasal respiration being perfect. In chronic cases there is a feeling of great dryness in the nasal cavities and nasopharynx. Frontal headache is at times complained of, aggravated by cold or dust, the remains of the dry membrane being very sensitive. The sense of smell is more or less impaired, at times completely wanting, through the involvement of the peripheral branches of the olfactory nerves. A complete loss of the sense of smell is termed anosmia.

The most important symptom which leads the patient to apply for treatment is the fetid character of his breath. The

fetid odor of the latter varies in degrees from a slight impurity to an unsupportable odor, rendering such unfortunate victims of this trouble in certain instances almost unfit for social communication. Thin or thick yellowish-green and gray crusts, sometimes tinged with blood, and of very disagreeable odor, are discharged through the anterior or posterior nares.

On anterior rhinoscopy we find a condition exactly opposite to that found in hypertrophic rhinitis. We observe an abnormal spaciousness of one or both nasal cavities, so that we can look straight through into the pharynx and see the wall of the latter.

On posterior rhinoscopy we observe the mucous membrane of the nasal cavities, naso-pharynx, and often of the pharynx itself, to be, as a rule, of a normal color, but it appears to be glazed and parched. Dry scabs are seen to adhere throughout the course of these cavities, which are removed only with difficulty.

The prognosis of atrophic rhinitis is, if the disease is properly and perseveringly attended to, a fairly good one.

In the treatment of atrophic rhinitis, the most important step is to free the mucous membrane from the dry, fetid crusts, and to keep it clean. The next step of importance in the treatment is to make stimulating applications, by means of a cotton-tipped probe dipped into the selected preparation, and by the atomizer. A good antiseptic and deodorizant cleansing solution is, ℞ Sodii bicarb., gr. xx, listerin. ℥ss, aquae q. s. ad ℥ii (or a solution of Seiler's tablets may be also used here). The atomizer is, unlike in hypertrophic rhinitis, to be preferred in atrophic rhinitis to the douche on account of the stimulation imparted by the force of the spray to the atrophied mucous membrane.

Among the stimulating applications, the following may be mentioned (always to be applied after thorough cleansing): ℞ Tinctur. iod.,glycerin., āā. partes aequal.; to be applied thoroughly over the mucous membrane with the cotton-tipped probe. A five per cent. or two per cent. preparation of keroline-ichthyol (a bland petroleum oil of the paraffine variety and ichthyol) is another good application. This latter preparation is extensively, and with very good results, used at the Man-

hattan Eye and Ear Hospital (nose and throat department) in New York.

Attention to hygiene and constitutional conditions is of the utmost importance.

Now a word as regards the use of cocaine as an anæsthetic in nasal surgery. It is the nasal anæsthetic *par excellence*. Somewhat stronger solutions are required here than when used in the eye. A four, six, or eight per cent. solution is the proper strength according to the amount and degree of manipulation required during an operation. It is, also, advantageously used to diagnose between an erectile congestion or true hypertrophy of the turbinated bodies. A plug of cotton saturated with a four or six per cent. solution of cocaine is introduced into one or both nostrils, as may be required, and left there eight or ten minutes. If, on removal, the previously enlarged structures have shrunken considerably, their enlargement was due to erectile congestion ; if they remain enlarged, we are sure that we have to deal with a genuine hypertrophy.

LACERATION OF THE CERVIX UTERI.

BY F. A. STILLINGS, M. D., CONCORD.

Fellows of the New Hampshire Medical Society: I propose to occupy but a few minutes of your time, and assure you that in bringing my subject before you, I do so with some hesitation, for instead of attempting an elaborate essay, I am going to call your attention to a condition you have all met with many times in the past, and will meet with many times in the future.

LACERATION OF THE CERVIX UTERI.

It has been said: "Its importance cannot be exaggerated, since one half of the ailments among those who have borne children are to be attributed to lacerations of the cervix." This estimate may, by some, be regarded as extravagant, but all will agree that many troubles do arise from this accident, some of which are very grave in their consequences.

The disturbance of the functions of the sexual organs, and of the general health, incident to this injury, is usually marked, depending somewhat, of course, upon the extent and number of the lacerations; though occasionally we see severe lacerations giving comparatively little trouble, while in other cases the local and general disturbances seem all out of proportion to the tear.

The injury first results in interference with involution, the uterus remaining large, and causing at first simply the complaint of a sensation of weight in the pelvis. The inflammation set up in the parts, in the effort at healing, results in many instances in much cicatricial tissue, and almost invariably enlargement and hardening of one or both lips of the cervix.

After cicatrization is complete there is nearly always, by reason of the dragging of the scar tissue, local irritation and frequently general disturbance through reflex action.

Inflammation of the cervical mucous membrane soon develops, the parts become bathed with a stringy catarrhal flow, and after a time the cervix becomes oedematous; the divided walls become everted and are constantly irritated by friction with the vaginal wall and its acid secretions. This condition has no natural tendency to disappear, and is extremely obstinate in its persistance even under most careful and prolonged local applications. The application of strong caustics early in the treatment, while checking the catarrhal flow at first, sears the mouths of the mucous follicles and they become closed and distended, giving the lumpy appearance familiar to us all. As these follicles become more distended they cause absorption of the cervical tissue, while giving a bulbous look to one or both halves of the divided cervix. By far the largest number of lacerations met with are lateral, including one or both walls, the majority, so far as my limited experience goes, being confined to one side. It is claimed that the second in frequency is "antero-posterior laceration, usually found in the posterior wall, but occasionally involving both." This accident, it seems to me, cannot be very frequent as I have never seen it in my own practice or that of my friends.

Third, come "multiple lacerations," usually three in number, but occasionally more.

Fourth: "incomplete lacerations."

In these cases the tear extends from within outwards through the walls of the cervix, stopping short at the vaginal mucous membrane. This form of laceration probably remains undetected in many cases, and without proper treatment. The parts fall together in a fairly natural way so that on digital examination the os presents simply a widened feel, and through the distortion of the tri-valve speculum in position shows as an ellipse, and is usually spoken of as a "patulous os."

As regards treatment of lacerations of the cervix uteri I wish to call your attention to the primary and secondary management. By primary I mean when the woman comes to us suf-

fering from endocervicitis and its accompanying troubles, and not when the accident occurs. It has been claimed that the laceration should be detected and repaired at the time of injury, but this seems to me impracticable, for the os is so dilated and distorted immediately after the delivery that it would be very difficult to determine that laceration had occurred unless the rent were very long; and if the tear were found it would be difficult to decide how much of the open cervix should, be closed, to say nothing of the improbability of getting union while the lochia was bathing the parts.

It is probable that union would occur spontaneously quite as frequently as after an operation at this time.

Primarily, then, our endeavor should be to secure involution of the uterus, which can usually be brought about by means of uterine massage, daily douches of hot water, and the application, two or three times a week, of glycerine tampons.

Secondarily, we should attempt: first, to relieve the endometritis consequent to the lacerations; second, stimulate the parts so that when the third step is taken, viz., the repair of the laceration by surgical means, we have comparatively healthy tissues to join together. In many of these cases involution of the uterus can be much hastened by curetting its interior thoroughly, using for the purpose a sharp curette, and washing out the cavity of the uterus with a mixture of Creolin, Tr. of Green soap and water.

In curetting with a sharp instrument it is, of course, important that the surface be left smooth, and not ploughed into furrows, and that the cervical canal be treated with the same care.

Preliminary treatment should always be given and persisted in until the tissues become as nearly normal as possible; notwithstanding it is said by some that the operation should be done at once, claiming that as soon as the torn cervix is united involution of the uterus will take place, the cervical catarrh disappear, and the reflex troubles abate.

I have seen the operation performed several times without this preliminary treatment, and in every instance the parts have failed to unite, and the division of the tissues has been increased just so much as was removed by the surgeon.

While all present have undoubtedly seen or performed the operation for restoration of the cervix, it can do no harm to go over the different steps in detail to freshen our memories.

While many surgeons prefer to do the operation with the patient in Sims' position, others prefer to have her on her back. One position probably has no advantage over the other except to the surgeon who has familiarized himself with the work in one particular position. I prefer the patient on her back and so may be pardoned for describing the operation in this position.

The instruments needed are an Edbohld speculum or a perineal speculum with a long handle and hook, to which can be attached a loop of bandage reaching to the floor, into which the operator can, if he wishes, place his foot and secure retraction of the perineum and thus do away with one hand of an assistant.

The other instruments necessary are three wire retractors, a straight bistoury or scalpel, long dressing forceps, straight and curved scissors, hawk-bill scissors, two narrow tenaculum forceps, four cervix needles threaded with No. 8 braided silk or silkworm gut, long needle holder and a knot tier, plenty of mops made of absorbent cotton, and a large douche bag filled with plain hot water.

After anaesthesia is induced the patient's hips should be brought to the edge of the operating table and the thighs flexed on the abdomen and held there either by assistants or a "leg-holder."

The field of operation should then be thoroughly cleansed, and for this purpose I use the soap and creolin mixture referred to above.

After the speculum and retractors are in position the tenaculum forceps are inserted, one into the anterior and one into the posterior lip, taking care to place them so as not to embrace any of the tissue it is desired to remove.

The uterus is then dragged down as far as it will come, and the several portions approximated to as near the normal position as possible, in order to determine the amount of tissue necessary to be removed.

The anterior forceps is then given into the hands of an assist-

ant, the hawk-bill scissors are introduced and carried up to where the points will engage the upper angle of the rent. The anterior and posterior lips of the cervix are then drawn together closely with the tenaculum forceps in order that the scissors may grasp as long a strip of the cicatricial tissue on each side as possible.

The hawk-bill scissors always make a clean cut at the upper angle, but the lower ends of the divided cervix are very apt to roll out from between the blades and leave the lower portion of the rent uncut. This can be finished with straight or curved scissors but many prefer a knife, as a smoother cut can be made than with the scissors, and besides the work can be done much more quickly.

In cutting these surfaces, which are expected to unite by first intention, we can see how desirable it is that all the cicatricial tissue be removed and the lines of excision as straight and smooth as possible.

Another point must not be lost sight of, viz., not to remove too much tissue, or notch the inner edges of the incisions, or we may find when union has taken place that we have closed the cervical canal or, at least, made it too small.

After drying the cut surfaces with the mops as well as possible the sutures are introduced from behind forwards, beginning at the lower end of the divided tissues, the parts being held exactly in apposition with the tenaculum forceps.

The sutures are thus continued up to the angle of the wound, each suture being drawn tightly with the knot-tier, and after all are in position, the ends are cut short if silk is used, but if the wound is closed with silk-worm gut the ends should be left long to prevent chafing the vaginal walls.

The tenaculum forceps are then removed and the bleeding from their punctures stopped by dry sponging and exposure to the air, or by touching the bleeding points with very hot water.

The vagina is thoroughly douched with plain hot water and then the edges of the wound and the vagina are wiped dry with the mops and finely powdered salicin placed on the wound until it covers it and, if possible, surrounds the cervix.

Small tampons are then carefully packed around the cervix on all sides, and one or more larger tampons placed in the

vagina in order to hold these in place, and, if possible, prevent movement of the uterus.

This use of powdered salicin is merely a personal fad, and it is quite likely that dusting the wound with iodoform and applying iodoform tampons does just as well.

Many times the after treatment recommended is entirely different from this, the claim being that the parts should be douched every day and no tampons used. I simply do not believe in it.

By the dry method I have seen the parts perfectly united and all the stitches removed on the fourth and fifth days.

After the operation the patient should be kept comparatively quiet in bed, and the nurse instructed to inspect the parts every day to see if there is any discharge from the vagina or the tampons are becoming sodden.

If there is no discharge, or it is slight, the packing need not be touched until the third or fourth day, when it should all be carefully removed,the wound inspected, and if there is apparent union one or two of the upper stitches may be removed at this sitting.

New salicin and tampons should then be applied and left two or three days longer, when the remaining stitches can be removed.

I have recently operated on a case in which I was much interested. The case was one—the only one I ever saw—where four lacerations existed. Three united perfectly but the fourth did not, and as considerable tissue had been sacrificed I determined to try and unite this without cutting away the edges. To do this I anaesthetized the parts with cocaine and with a small triangular knife split the two sides of the rent to the depth of a little more than an eighth of an inch. I then entered a suture of silk-worm gut at the end of the cervix just outside the bottom of the wound, carried it up to the angle, dipped into the opposite side and brought it down and out at a point corresponding to its entry. On making traction on this I found it caused the split edges to bulge and brought the two raw surfaces together. I tied this moderately tight and then united the edges with fine superficial stitches. On the fourth day I removed two of the superficial sutures, and two days later the

remaining two, leaving in position the deep one that entered the end of the cervix.

Two weeks later she returned, having in the meantime menstruated, and on removing this deep suture I found the parts firmly united.

As I said in the beginning, I did not intend to read a long essay, but simply to call your attention to a condition met with daily, and I have the modest hope that this short paper will stimulate your interest in its subject.

Dr. Russell, of Concord.—Unfortunately I was too late to hear the able paper of Dr. Stillings or the discussion of it by other gentlemen. I have but little to say, and I have no doubt the whole ground has been covered.

Trachelorrhaphy, when first suggested by Dr. Emmet, received the cordial approval of a part of the profession, and the severe criticism of others, but it has gradually worked its way to the front, and is to-day a surgical procedure of acknowledged merit. It is adapted to nearly all cases of recent laceration. If the laceration has existed for a length of time, it will have produced, in addition to chronic metritis, disease of the follicles of the cervix, with or without erosion. If degenerated tissue is allowed to remain, the condition of the patient will be as bad after the operation as before. Schroeder's operation or modified trachelorrhaphy is indicated in these cases.

The tendency, I think, in simple trachelorrhaphy is to sacrifice too much tissue. I have been most successful where I have removed but very little tissue. Emmet lays great stress on the removal of what he terms the "cicatricial plug." This, at the present time, is not insisted on by our best operators. The cicatrix is almost always superficial, and the removal of a thin layer of cicatrized tissue is sufficient to secure good union and good results.

As endometritis is a nearly constant result of laceration of the cervix, curetting should always precede trachelorrhaphy.

Then I would emphasize these three points: Curetting previous to any operation for the repair of the cervix, the sacrifice of as little tissue as possible in all recent cases, and the thorough removal of degenerated tissue in cases of long standing.

Dr. Adams.—This is a subject in which I have been considerably interested,—one of the frequent operations we have had at our hospital. I wish to say a word with reference to one or two conditions that we find, and a little different method of operating that I have adopted myself, that has rendered the operation considerably easier to me, and by which I have got better results than I used to in the older method of operating. Very often, when we have a double laceration laterally, we will find that the anterior and posterior lips are both greatly hypertrophied, and by cutting with the hawk-bill scissors at the angles and then by cutting out the sides, leaving the mucous strip down through the middle, we will find it very difficult to bring the two edges together. But I have adopted this plan: Leave a mucous strip in the middle of the anterior lip, and cut the posterior lip right straight across—taking all the mucous membrane off and cutting it straight across. Then it adapts itself to the anterior lip very much easier; and I never have had any trouble in getting union.

I think this is one of the most frequent operations we meet with at the present time. I think there are very few women who have borne children but have more or less laceration, and it is recognized at the present time as a frequent cause of malignant degeneration or cancerous change; and I think that these cases ought to be looked after more carefully than they ever have been, and that the operation should be performed very much more frequently than it ever has been. I believe that very many women might be saved from cancer by having the operation on the lacerated cervix in due and proper time. I have operated a number of times where they have borne children afterwards, and I am thankful to say that in two of those cases that have fallen into my hands I got no second laceration. One was a double laceration, where I cut the posterior lip straight across, brought it up, and got good union. I curetted at the same time. Within eighteen months the woman bore a child, and no laceration followed.

Dr. Smith.—There are always two sides to every question, and it is a good thing to have both sides brought up. So I want to express my conviction that these cases have been operated on many times when they had better have been left alone.

It seems to me there has been as much humbug in operating on lacerated cervices as in any department of surgery. At the same time I would entirely agree with Dr. Adams that there are many cases which ought by all means to be operated upon.

But what I wanted to speak of especially was an experience I had this winter in the case of a lacerated cervix. It was a case of placenta prævia. I was called in consultation to see the case, found two doctors there—this was three o'clock in the morning—who had been there since three o'clock the day before, relieving each other in holding a tampon against the cervix. The woman had flowed severely, and her condition was such that they did not dare to withdraw their fingers from the pressure on the tampon. She did not look very badly; she looked as though she would probably get through with the labor. We made our preparations, took out the tampon and delivered the child, getting hold of the leg and bringing it down, then the other leg, delivering the child not very rapidly, waiting for pains. There was no hemorrhage during the delivery. And after the delivery (the child was dead) the woman seemed to be in excellent condition. She spoke cheerfully about her relief when the labor was finished, and for half an hour there were no bad symptoms. I went out into another room, and within a few minutes I was called back and found that the woman had had a sudden rush of blood and was very much blanched. To make a long story short, the woman was dead within an hour. The hemorrhage went on; we tried every means that we knew of to prevent it. The uterus was hard and firm immediately after delivery, and everything seemed to be all right. We could not account for her continued hemorrhage, not rapid, but steady—nothing could stop it. We recognized the fact that the cervix was torn, and tried to compress it; and of course we kept hoping that every new measure we tried was going to be successful, until finally the woman went over the line and nothing could restore her.

I afterwards read a description of a similar case in a journal of gynæcology, and I made up my mind that if I had another such case I should put the woman on her side and introduce a Sims speculum, bring the cervix outside, and sew it up.

I should not have thought, until I read that article, that that

could be done. But after reading of this operation in a similar case, I was satisfied that at all events it was well worth trying, and it seems to me quite probable that the cervix could be pulled down in sight so one could rapidly and readily sew it up. Of course, to sew the cervix inside, under such circumstances, would be almost impossible. But if you could get it down into view I do not see why it could not be quickly sewed up so as to stop the hemorrhage. In this case I believe that the hemorrhage came from the circular chain of vessels around the cervix.

Dr. Hill.—Do you suppose that the hemorrhage resulted from that or from within the cervix?

Dr. Smith.—From the cervix. I believed so because the uterus contracted firmly from the beginning.

Dr. Hill.—It relaxed afterwards, did n't it?

Dr. Smith.—It did not relax until the woman was in such a state of collapse that all muscles were relaxed. There was a manifest rent—two or three of them—in the cervix, and I was convinced that the blood came from there.

Dr. Welch.—Dr. Smith does not tell us how he disposed of the placenta. The question occurred to my mind whether the hemorrhage was really from around the cervix or whether it was the result of the placenta prævia.

Dr. Smith.—The symptoms of placenta prævia had shown themselves previously. The doctor who had charge believed the hemorrhage was from placenta previa, because she had been flowing at her periods for several months, and because she had had an aunt who had died of the same trouble. After taking out the tampon I could put my finger around the edge of the placenta and rupture the membranes. I then got hold of the leg, and as soon as I did that, and began to pull the child down, the hemorrhage ceased, and there was no hemorrhage during the labor. The child was delivered and the placenta came just as it always does. After the whole thing was out the uterus was hard and the woman seemed to be all right. Probably the blood was leaking during all this time, and when the flow came it was simply the expulsion of what had been collecting.

REPORT OF CASES OF PUERPERAL SEPSIS.

BY J. ELIZABETH HOYT, M. D., CONCORD.

Puerperal sepsis is now looked upon as an unpardonable occurrence in the physician's practice, yet cases unaccountable do occur, and since I have had them I am going to report the same to-day and take the risk of being criticised.

The June *Medical and Surgical Journal* of 1893 has a most excellent article on this subject by Dr. Edward Reynolds, and I should like to preface the report of my cases by a reading of the entire article, but as time will not admit of that, however, I will quote a portion or two only. As to diagnosis, he asserts that severe labor is not infrequently followed by moderate pyrexia, and when this is limited to the first forty-eight hours, it is strictly comparable with the similar elevations of temperature so frequently observed after surgical operations, and is independent of sepsis. When, however, this pyrexia becomes aggravated or is even continued, after the first two or three days of convalescence; or when, after a similar period of normal temperature, even a very slight elevation is observed upon the third, or fourth, or fifth day (or even later), the attention of the physician should at once be directed to the diagnosis of its cause, and a suspicion of the presence of sepsis should, of necessity, be excited in his mind; and he must be careful not to allow himself to be led into an unauthorized negation of its existence, by his natural aversion to the admission of the possibility that sepsis may arise in his own practice.

Obstetric sepsis is characterized by an elevation of temperature; an abnormal tenderness of abdomen, especially localized over the uterus or its adnexa; diminution and foulness of the lochial discharge; diminution of the amount of milk, and frequently of all other secretions and excretions of the body.

In presenting the following cases, I will state that the first two fell to my lot while on duty in the out department or district work of the dispensary in Boston. The last two, much milder cases, have occurred during the past year in Concord.

Mrs. B—— aged 23, primipara. March 4, 1892. Membranes ruptured 10:30 a. m., patient first seen in eve—no pains—on vaginal examination elbow of child found prolapsed. Running the examining finger of right hand along the flexor surface of the child's forearm, to the hand, the thumb and fingers of the child were found in position to be grasped, as in shaking hands, thus indicating a left cephalo iliac dorso anterior position with right shoulder presenting.

Assistance was called and combined version performed by means of left hand of accoucheur in utero, which grasped and brought down the right leg of foetus, while the right hand, supplemented by the assistant's two hands, made pressure and turned from without. A tape was attached to right leg and traction made. After a while left leg was found and traction made on both, so that right arm was drawn up, breech out, arms brought down, after coming head extending, forceps were put on to start it. Child delivered (dead), (heart not discernible before delivery began).

Much flowing followed, but slowly. Two clots, each the size of two fists, passed within two hours after delivery. Ergot ʒ iii. in divided doses given and foot of bed raised on chairs. Ice applied to abdomen. Flagulations with wet towels made. There was no hot water obtainable for douche after delivery, so cold water was used.

Second day. Patient flowing considerably. Odor as at time of delivery, very disagreeable. Temp. and pulse normal.

Third day. Temp., 99°. Patient comfortable.

Fourth day. Temp. a. m., 99.5°, pulse 100; p. m., temp. 100.6°. Carbolized vaginal douche ordered and salicylate cinchonidia gr. iiss. every two hours.

Fifth day. Temp., a. m., 101.6°; p. m., 102.8°, pulse 128. Lochia very foul smelling and a dark brown color. Gave intra uterine bichloride douche 1-5000 and quinine suppos. gr. v. Temp., in ½ hour fell from 102.8° to 101.6°, milk was coming into breasts, and consultant advised cold compresses, which were applied. Quinine gr. x. by suppos. given at 10 p. m.

Sixth day. Morning temp. 100.6°, pulse 100; evening temp. 103°, pulse 106. Complexion is sallow and odor of discharge permeates whole room. Curetted and irrigated with potassium permanganate. Temp. dropped from 103 to 102.8 only, after curetting and irrigating, pulse from 106 to 96.

Seventh day. Temp., a. m., 104°, pulse 98, very weak. Potassium permanganate intra uterine given. At 3 p. m., temp. 104°, pulse 108. Headache intense, bowels not moved in several days. Magnesium sulphate ℥ ss and quinine in v. gr. doses up to 30 gr. in 24 hours ordered. Phenacetine gr. x., and whiskey ʒ ii. every two hours, also given. At 7:45 p. m. temp. fallen from 104° to 99.9°, pulse from 108° to 96°. Perspiration profuse.

Eighth day. Temp., a. m., 100.8°, pulse 94. Patient feeling much better. Lochia a better color and odor of room gone. Temp., 4:30 p. m., 103.2°, pulse 98; carbolized douches, quinine and whiskey, with occasional doses of salicylate cinchonidia continued.

Ninth day. Patient had two chills, one at 11 o'clock on previous eve, the other at 5 o'clock this morning (fire had gone out in room during the night). Temp., at 8:30 a. m., 103°, pulse 124. Uterus irrigated with 1-5000 bichloride. Iodoform suppos. introduced. Temp., p. m., 102.4°, pulse 96, rather thready.

Tenth day. Temp., a. m., 103.4°, pulse 108; tongue coated with thick dry brown fur, previously the coat had been moist and white. Red spots appeared in cheeks. Quinine stopped, and salicylate cinchonidia gr. v. every 2 hours began again. Heart shows a murmur not heard before. Digitalis gtt. v. every 4 hours. Patient vomited brandy and water twice. Temp., 8 p. m., 100°, pulse 88, dicrotic.

Eleventh day. Temp., a. m., 103.6°, pulse 98, dicrotic. Intra uterine douche of permanganate given, salicylate cinchon., digitalis, and whiskey continued. At 3 p. m., temp. was 101.6°, pulse 90; slept a good deal during the day. Temp., at 8 p. m., 101°, pulse 96.

Twelfth day. Morning temp. 103.3° pulse 100; less dicrotic. Vomited digitalis and brandy every time attempted to take it during the night. Bowels not moved since the eighth day. Lochial discharge and odor slight. Magnesium sulphate ℥ ss ordered and an intra uterine douche of permanganate given. At 3:30 p. m., temp., 102.3°, pulse 100, full, bounding, and dicrotic. At 7:30 p. m., temp. 99.9°, pulse 88. Patient has slept nearly all day. Has had only slight discharge but that has been of better color. Vomited twice, feels sick from the salts.

Thirteenth day. Morning temp., 101°, pulse 88. Respiration somewhat short and rapid, a stitch pain under and in a line of right nipple. Coughs some. Vomited medicine twice during the night. Temp., at 4 p. m., 103.6°, pulse 106. Bowels not yet moved; gave castor oil ℥ ss. Temp., 9 p. m., 103.2°, pulse 108. Phenacetine gr. x. given.

Fourteenth day. Temp. 105.4°, pulse 120, respiration 46. Crepitant râles heard in two spots of posterior lower lobe of

right lung. Patient says she feels comfortable. Amm., carb., gr. iii. every two hours added to the above treatment, and phenacetine gr. x. At 4 p. m., temp. 100.3°, pulse 92, respiration 42; at 8 p. m., temp. 105.8°, pulse 120, respiration 46. Patient on verge of delirium.

Fifteenth day. Temp., at 8 a. m., 103.4°, pulse 110, respiration 46. Vomited slightly during the night, got out of bed and sat on chamber in the night, fainted and fell over. Patient has had no bowel movement since the thirteenth day, so a small enema ordered. Temp., 4 p. m., 103°, pulse 120, respiration 46; has had only a small movement but great distress in bowels. Temp., 7:30 p. m., 105°, pulse 124, respiration 52. Has had two doses of phenacetine aa. gr. x. during the day.

Sixteenth day. Morning temp. 103°, pulse 106, respiration 46. Discovered this morning that patient has been twenty-four hours without her whiskey. Pulse weak, resolving râles all through lobe on right side posteriorly. Crepitant râles in places through lower lobe of left side. Amm. carb. still continued, and in addition ℞ Amm. anasatatis ʒ ii., tr. strophan. gtt. xxx., aquae ℥ viii., et sig. ʒ i., every hour or two. At 4:30 p. m., temp. 102.6°, pulse 118, respiration 40. Patient has had two good bowel movements during day, gave phenacetine gr. x. Temp., 7:45 p. m., 101.5°, pulse 104, respiration 42. Patient very weak. Stimulants increased. Brandy ʒ ii-iv. every hour for the night.

Seventeenth day. Patient very weak, respiration somewhat increased. Temp., 2 p. m., 103°, pulse 126, respiration 46. Oxygen given several times during the day. At 9 p. m., heart intensely weak and respiration growing more and more shallow. Brandy was pushed per mouth and rectum. At 10, 10:30, 11, 11:30 p. m. hypodermic injections of strich. sulph. gr. $\frac{1}{40}$ were given with brandy. Patient rallied for some hours.

Eighteenth day. Patient began to sink again about 8 a. m. The hypodermic injection of strich. again repeated, prolonged life a few hours, but patient died about 11 a. m. A post mortem was asked for but refused.

Mrs. G., colored, half Indian, with syphilitic history. Patient a multipara, this being the second child.

Membranes ruptured at 9 a. m., and pains ceased. I was called at 10:30 a. m. Os dilated somewhat larger than a silver dollar. Feet and buttocks presented, spine posteriorly a little to the right, thus giving a right sacro-posterior position. At 1 p. m. patient etherized, feet of the child grasped, buttocks delivered, body turned so as to bring spine anteriorly, arms and head delivered.

At beginning of delivery os had dilated to about four inches

in diameter. During delivery the cicatricial tissue from former lacerations was slit through, involving the entire neck and extending slightly beyond the internal os on right side. The circular artery was torn, causing severe hemorrhage. Hot intra uterine douches (118°) were given. Ergot ʒ ii. administered. The patient was left quiet about 3:20 p. m. On my return at 6 p. m. found the patient had had profuse recurrent hemorrhage. Foot of bed was elevated. Ergot administered and hot water intra uterine repeated. Case progressed well until third day, when lochia became foul. Creoline douches were given b. i. d.

On fourth day introduced the vaginal speculum. Pus was found welling out from the laceration on right side, filling up the whole vagina. Temp. 103°, pulse 112. Curreted and irrigated uterus with bichloride 1-5000, packed with iodoform gauze, and gave quinine suppos. gr. v. every four hours. Continued with creoline douches t. i. d., giving them through the speculum, renewing gauze each time.

On tenth day, the temp. and pulse having remained high, the discharge very copious and foul, curetting was repeated and syringed uterus with peroxide of hydrogen.

On fifteenth day, curetted the lacerated surfaces and repeated this for several days following, using the peroxide each time. Creoline douches b. i. d. were also continued.

Throughout the puerperum patient complained of rheumatic pains in back and joints. In seventh week patient, having been up and around, but very weak, developed nephritis with a strong regurgitant heart murmur. Here I lost sight of her, as she passed into other hands.

Mrs. H., thirty-six years of age, American, multipara, this being the seventh child. Has had frequent asthmatic attacks for years, particularly aggravated for a week or more after each delivery. History of former retroversion.

February, 1894. Called at 2 a. m., to find patient flooding. Os dilated to size of fifty-cent silver piece and placenta just at its margin. Placenta prævia partialis. On examination I manually assisted dilatation and hemorrhage ceased. At 4. a. m. there was a slight recurrent hemorrhage which was controlled by a like procedure. Pains continued slightly till 3 o'clock next afternoon, and then as hemorrhage started up for the third time, quinine gr. v. were given, which with manual assistance controlled the hemorrhage, completed dilatation, and delivery was accomplished about 4:30 p. m. The post partum hemorrhage was very hard to control. Ergot, hot water intra uterine injections, abdominal flagulations, ice to abdomen, vinegar and turpentine were employed.

Patient severely annoyed by asthma, was given each night as

attacks came on quinine gr. v., repeated once or twice if needed. Temp. and pulse behaved properly until the end of the sixth day, when temp. rose to 101°, pulse 94, lochia entirely suppressed.

At 12 and at 2 a. m., beginning of seventh day, patient had chills, temp., at 9 a. m., 101.6°, uterus irrigated and discharged a black and foul smelling liquid of strong foecal odor.

For several days the temp. and pulse were better, but on the tenth day the lochia was entirely suppressed again. A second irrigation given, was with result of more foul smelling dark liquid, but not so thick as the first, and of the same foecal odor. A third time the uterus was irrigated and iodoform suppos. employed. After this the patient convalesced uninterruptedly, retroflexion soon returned, and the posterior cul-de-sac had to be tamponed twice a week with Co. iodine ointment alternated with ten per cent. ichthyol.

Two months after delivery menstruation re-established itself and was very profuse. The discharge lasted seven days in spite of ergotine suppos gr. iii., b. i. d.

Mrs. C., twenty-six years old, of Irish parentage but American born, primipara.

March 15, 1894. Called to patient at 2 a. m. Os then dilated the size of ten-cent piece. At 8 a. m. the first stage was completed and head reached the perinaeum. Head remained on perinaeum till 11 a. m.

At 9:30 some little progress was noticed, so forceps delayed, but at 11, after giving quinine, forceps were applied and head extracted with difficulty.

Second day. Patient seemed to be doing well, but odor of discharge noticeable in the room. Vaginal douches of carbolic or creoline ordered b. i. d.

Third day. Temp. 101°, pulse 84. Odor of discharge still noticeable, temperature thought to be due probably to excitement of baby dying and perhaps to the milk coming. Quinine gr. v. b. i. d. given.

Fourth day. Temp., a. m., 100°; p. m., 101°. Patient somewhat excited by the funeral. Quinine gr. v., b. i. d., continued.

Fifth day. Odor permeated whole house. Breasts large and full. Considerable abdominal tenderness. Temp., a. m., 101°, pulse 118, cervix sloughing. Curetted and irrigated uterus with bichloride 1-5000, applied ichthyol ointment to external area of abdominal tenderness, gave magnesium sulphate ℥ ss. and applied massage and bandage to the breasts. Temp., p. m., 102°. The salts were repeated, since the first dose did notmove the bowels.

Sixth day. Temp., a. m., 99.8°, pulse 84; evening temp. 100°. Odor much less. Breasts much reduced in size.

Seventh day. Temp., a. m., 98.6°; p. m. 99.8°. Breasts in good condition, abdominal tenderness much less.

Eighth day. Temp., a. m., 98°. Patient began flowing considerably at 11 a. m., and kept it up without reporting until 9 p. m. Patient then found with pulse 124° and temp. 99+. Odor very bad.

Ninth day. Temp., a. m., 100°, pulse 124; p. m., temp. 101°. Complexion very sallow. Brandy ʒ ii. every two hours, and salicylate soda gr. xv. every six hours, ordered.

Tenth day. Temp. 101°, pulse 124, odor strong. Cervix still sloughing. Curetted again and irrigated uterus with bichloride 1-6000.

Eleventh day. Temp., a. m., 100.8°, pulse 120, odor persisting. Irrigated uterus with creoline and applied peroxide of hydrogen to cervix.

Twelfth day. Patient improved from this time but gained strength very slowly. Persistent retroversion demanded tampon supports with application of bellad. and iodine ointment twice a week.

Dr. Conn.—As the reader of the paper has brought in the name of Dr. Edward Reynolds, of Boston, and the paper which he read last week before the Massachusetts Medical Society, I would say that I heard a portion of the paper and the discussion which followed it. The discussion brought out this fact, that many of those whom we consider our medical teachers—and Dr. Reynolds is a teacher of obstetrics—say that the indiscrimininate use of douches is to be condemned; that no douche should be given subsequent to the first twenty-four hours after confinement; that the danger of carrying septic matter into the uterus is too great in the use of douches after the first day. It was also said that, even in such cases as have been reported, the immediate use of the curette was to be thought of, and in many cases it should be used. That brought out a strong discussion as to whether the curette should be what is called the dull or the sharp curette. Dr. Reynolds said he had for many years used himself and taught his students to use the sharp curette in preference to the dull one, but he had it made with a long flexible handle, almost like the uterine sound, and he could place it in any position. More than that, it was large. The arch of the curette would measure three quarters of an inch,

and there was so much surface that it was almost impossible to do any damage by using it. He said that for so many years they had taught it and used it in the lying-in hospital, and that no trouble had ever come from it.

In the matter of the use of corrosive sublimate there was a division of opinion. The well known effect of corrosive sublimate, to cause coagulum to cover the internal surface of the uterus, was thought by a great many to be the reason why the uterus had to be curetted the second time. I have no opinion in regard to that, only this, that in the treatment of wounds I am not so free with my solution of corrosive sublimate as I once was. I think the use of boiled water is sufficient, and does not coagulate the surface, which must necessarily be removed in some way, else we do not get union by first intention.

One other point occurred to me while the paper was being read,—that one or more of these births were still-born, and something was said to the effect that the breasts were doing well. But I do not remember anything being said as to their care. Now, in the experience I have had several years, I have always made it a point, in cases of still-born children, to say to nurses and every one connected with the patient, to let the breasts alone—that they should not touch the breasts in any way, shape, or manner. In twenty-four hours I would put on strips of adhesive plaster, and never use any breast-pump, or allow any one else to. The trouble is all over in forty-eight hours, and I have never seen a so-called broken breast as the result of that treatment.

Dr. Hill.—I want to inquire of Dr. Conn if he said the douche should not be used after twenty-four hours?

Dr. Conn.—Better not use the douche after twenty-four hours.

Dr. Hill.—I do not consent to that at all. It seems to me they do great good to wash away offensive matter. It seems to me that water ought to be used.

Dr. Conn.—It was considered better to use gauze, to use the curette, rather than carry the nozzle of the syringe through the debris that must be in the vagina, and introduce that into the uterus.

Dr. Hill.—If you use water enough to wash away all offensive matter it is all right.

Dr. Hoyt.—As to the treatment of the breasts which Dr. Conn spoke of, there was nothing done except strapping them tightly with a bandage, although I think Dr. Conn's method of the adhesive plaster is better. I have used that myself in some cases. As to the cold compresses which were applied some time later than forty-eight hours, I cannot say I believe in that, but in this case it had to be done. Whether that had anything to do with the later result I do not know. If the irrigation of the uterus is done through the speculum, and the vagina thoroughly washed out, I can see no reason why foreign matter should be introduced into the uterus, if care is used, and no more so than with the curette.

Dr. Holbrook.—I would like to ask Dr. Hoyt if she makes a practice of using the douche after normal labors.

Dr. Hoyt.—In private practice I do not think there is often need of that. Of course in a hospital they do a great deal more frequently.

REPORT ON SURGERY.

UNUNITED FRACTURES, TUBERCULAR BONES, AND RESECTIONS.

BY D. S. ADAMS, M. D., MANCHESTER.

Probably no branch of surgery has been more neglected by this society for the last fifteen years than that that pertains to the conduct of, and operations on, the bones, while at the same time probably no branch of surgery has made any greater advancement; therefore, looking the field over for a subject, I chose this, not because it is an inviting subject to develop, but because I believe that the cumulated experience of this society for ten or fifteen years, together with the advance of knowledge, ought to furnish a most interesting discussion even if the paper only touches a few points.

I therefore propose in this paper to touch upon the following subjects: Ununited fractures, causes and treatment, with cases; tubercle of the bones, with one case affecting the lower end of the tibia, with evidement and iodoform emulsion injections, and two cases affecting the hip, one with simple aspiration and one with resection, and one case of sarcoma of the superior maxilla with resection.

My first case is Mr. W., age sixty-five, feeble, hostler, American, who was admitted to the Elliot Hospital, Manchester, June 1, 1892, for ununited fracture of the right humerus, and gave the following history:

May 20, 1891, he was kicked by a horse, and the humerus was fractured at the middle. He was taken to the City Hospital, Boston, and the fracture was reduced and put up in proper splints. He remained in the hospital fifty-eight days, then was an out-patient two months, under various treatment, without getting union. He came to Manchester and entered

the Elliot as above, June 1, 1892. The muscles were flabby, and had but little tone. The arm was incised on the external side, and a pseudarthrosis was found, surrounded by strong ligamentous bands. These were cut through, and the ends of the bones turned out and cut off about half an inch each, and drilled through on each side and wired together with silver wire, and the arm put up in a well-fitting leather splint that had been previously moulded to the parts. The arm was kept in the splint for four weeks, closely bound to the side of the body, when the splint was removed and it was found that there was no union. It was then put into plaster and kept four weeks longer, when this was removed, and there was no union. We tried hard to have him exercise the arm and develop the muscles, and at the same time we used iodine faithfully; but our efforts accomplished nothing. He returned to Boston City Hospital and was advised to have nothing further done, but not being satisfied, he went to the Massachusetts General Hospital where he received the same advice; thence to the Emergency Hospital, where he was advised to undergo further operation. He entered the Emergency in November, 1893, and the upper fragment of the bone was resected, that is, from the fracture up to the shoulder joint. He remained in the hospital sixteen days, then got a boarding-place near by and remained there under the same surgeon's care for three months, bnt got no benefit. He is now in the Woman's Aid Home, Manchester, with a useless arm.

Second: Willie C., age nine, schoolboy, American born of Irish parentage, fell from a building and produced a compound fracture of the right thigh at the middle. He was admitted to the Elliot July 8, 1892, one or two days after the fracture, and the leg brought down and narrow splints applied, and eight pounds extension put on. Suppuration soon followed, and the wound was dressed twice daily and each time douched with an antiseptic solution. July 24 the splints were removed, and as there were no signs of union and the suppuration continued it was put up in plaster with fenestra through which to treat the wound and the weights were no longer used. August 19 the splints were removed and there was no union, so on the 20th it was cut down on and the bones were found to overlap some, and it was also found that the posterior half of the upper fragment was missing for about four inches. Probably it was split off from the main shaft, or cracked through, and the suppuration dissolved it. The ends were sawed through and put in apposition, and a posterior opening was made to give thorough drainage and a tube inserted, and it was put up in narrow splints with four pounds extension. It healed kindly, and October 6 the splints were removed and we had firm union.

The third is Mr. B., age twenty, laborer, of Canadian birth, strong and healthy; was thrown from a wagon December 17, 1892, fracturing the right humerus about the middle. The fracture was oblique, and the lower fragment just pricked through the skin. Eight hours after the fracture he was anæsthetized and the arm brought into place, special care being taken to release the fractured ends from the muscles and fascia. The arm had swollen considerably, and it was impossible to tell just how much was accomplished. The arm was put up in anterior and posterior elbow splints reaching well up to the shoulder both sides. The puncture healed without suppuration. In a few days the dressings loosened and remained quite loose for four days, when they were again tightened and kept tight for five weeks, when they were removed and there was no union. Iodine was freely used, and the arm was thoroughly exercised regardless of its condition, but as there were no signs of union at the end of three weeks longer he entered the Elliot February 16, 1893. He had toned up the muscles and increased the nourishment considerably by the exercise. The bone was laid bare, and considerable muscle and fibrous tissue were found between the ends of an oblique fracture. An effort was made to release the bones, and it was found impossible to do it without cutting. The muscles and fascia were therefore cut through and the bones placed in apposition, drilled, and fastened with coarse catgut, and the arm again put up in elbow splints, and we got good union so he was discharged April 29, 1893.

To be sure, there was a fault in letting the dressings remain loose four days, but this was corrected, and the patient was exceedingly careful from this time on. We are fully satisfied that the fractured ends of the bones were never entirely released from the muscle and fascia, and thoroughly convinced that it would have been impossible to release them without cutting. We have here three causes of non-union, and to these we may add lack of proper support to the limb, allowing too much motion.

These four are the only causes with which I have ever met, although I am aware that our books add syphilis and the acute diseases. The first of these was in the Boston City Hospital, where it had the best of skill and attention, and as it was a transverse fracture it is not probable that there was any interposition of the soft parts, so it must have resulted from general lack of nourishment to the parts, resulting from age and so forth.

The second was due to suppuration, which actually dissolved

a portion of the end of one of the fragments and probably dissolved the granulations as fast as they were thrown out.

The third was due to interposition of the soft parts, and while absorption of interposed soft parts may take place sometimes, I do not believe that any one would have been justified in waiting in a case like this, for I do not think it would ever have taken place. Now what ones of these can we prevent in general practice?

The lack of proper nourishment we can do but little to remedy when it comes from old age, from long continued debility, or from diseased bones. When from syphilis, slight debility, or loss of blood, we can do much with proper internal remedies, the free use of iodine, rigid exercise, and a judicious use of the rubber mallet.

In these cases the question of splints is often very perplexing, for when we have kept the limb perfectly still for from six to eight weeks with no union, if we remove the splints and give the limb its entire freedom, union often takes place. We should be governed by the reaction following the injury. Usually this is sufficient to give the reparative process sufficient impetus to complete the cure, but this sometimes fails while at other times it overshoots the mark. When it falls short a new impetus is demanded and we get this from the use of the parts, the use of iodine, and the use of the mallet.

Prof. T. M. Markoe, the pioneer in this treatment, sometimes removes all restraint, even from a fractured thigh, and requires the patient to walk around on it with as little artificial aid as possible and often gets most brilliant results when nearly all hope of union had previously been abandoned.

I have seen cases where the mallet did wonders. Mrs. W. about thirty years of age, with fractured thigh, had lain ten weeks with splints and extension and had got no union. The splints were removed and the weight reduced, and the mallet used about every third day for four weeks, when fair union had taken place, and in four weeks more, with only the extension and a posterior support the union was solid.

The second of the above cases was caused by suppuration. Can it always be prevented? There seems but one answer to this question to the conservative surgeon, for often the end of

the bone when it penetrates the skin comes in immediate contact with the dirty clothes or skin, or dirt gets into the wound sufficient to cause suppuration in spite of all the antiseptic washing that can be done, and like many minor injuries by machinery, where the dirt is ground in, unless you needlessly sacrifice the parts, often parts that are of measureless value to your patient, you must take the risk of suppuration.

Where suppuration does take place I would advise a counter opening from the side where your compound puncture is and through drainage by tube if possible. Often it is very difficult to pass a tube, but when so, I have resorted to the following expedient: First make your opening so you get a fairly free stream of water through the limb and then tie a little cotton on the end of a silk thread and pass it into one side with more or less thread and wash it through. This once through, attach your tube and draw it through. With this we can keep the wound clean and often get union, but sometimes with the best of care we fail.

The third of these cases was interposition of the soft parts. We do not believe the surgeon can always remove the soft parts from between the ends, nor do we believe that he can always tell whether he has accomplished it or not.

Frequently the muscles are drawn very tense, and the bone may bend considerably before it gives way and the splinter may penetrate a fascia and muscle so that when the muscle relaxes and the bone straightens the bone has penetrated so deeply that it is impossible to release it without cutting down on it, and as one cannot always tell whether he has released the bone or not, no one would think of converting a simple into a compound fracture, on uncertainties.

The fourth: Lack of proper support ought nearly always to be avoided, yet in some cases we cannot hold our splints with bandages or straps, and the skin is so tender that we cannot use adhesive plasters, and in these cases plaster of paris is very unsafe, and some patients are so irritable and intractable that we can do but very little with them, so we sometimes fail here.

In operations nothing in my judgment will take the place of coarse, well cromated catgut for fastening the bones together.

It may be put in on all four sides, and it will do much to hold the bones in apposition.

In diseases of the bones, since the earliest writing, we have had presented to us two distinct theories that have been strong rivals of each other, the traumatic and the scrofulous. Each of these has had its advocates and times of ascendency, and probably most members of this society have believed at times that scrofula is the cause of all bone diseases, while at other times they have believed that all cases of bone disease are caused by some trauma.

How beautifully our later investigations and bacteriological researches have hinged these two theories together and taught us that both causes are necessary, the one as a predisposing, and the other as an exciting, scrofula being used synonymously with tuberculosis. Thanks to the researches in bacteriology, we are beginning to walk in the light with a rational system of treatment based upon the removal of the cause.

We are taught now that tubercle is far the most frequent cause of chronic bone and joint diseases, and even so frequent that König claims that in surgical clinics we meet with a hundred tubercular joints as often as we meet with one of the other varieties of joint inflammation and that a very large proportion of the chronic diseases of bones are tubercular and that about forty per cent. of these cases are primarily articular, or that in forty per cent. the primary localization of the tubercle takes place in or around the joint, while in the other sixty per cent. tubercular depots are found at the same time in some other part of the system.

Probably greater experience and more extensive statistics will prove the above statement to be exagerated as they are apt to be in all new investigations, for I see no good reason why the other forms of inflammation should not take place here as elsewhere; yet the question is sufficiently settled to assure us that we very frequently meet with tubercle of the bones and joints.

The most frequent exciting cause is slight trauma that causes a subacute inflammation from the beginning or one that is just sufficient to unbalance the pressure from within, and the contractile force of the capillaries, so as to cause a dertermination

of blood to the parts and extravasation into the tissues and obstruction of the lymphatics thus accumulating the tubercle bacilli that are floating in the fluids of the body.

It may affect nearly every bone and nearly every joint in the system, and it may appear in almost every form of bone and joint disease. These cases usually take place in what is commonly known as scrofulous subjects, or what we know now as tubercular subjects.

These subjects are nearly always the children of tubercular ancestors, and the tubercle bacilli are directly transmitted and they may lie dormant so far as the effect on the person, through one or two generations and then localize and spring into life when a slight trauma prepares the soil for their development.

A colony may take possession of a lymphatic gland and abide there for years without affecting any other tissue. In rare cases undoubtedly a non-tubercular person may become infected from without. We have also learned that if they become localized in a joint or form a focus in a bone, and we can entirely remove them that our patient stands an excellent chance to entirely recover.

In forty per cent. of these cases there would be a radical cure, while in a large proportion of the other sixty per cent. there probably would never be any further trouble. Also clinical research has gone far enough to prove that iodoform destroys tubercle bacilli. Often by injecting this into a tubercular focus in a bone it will cure the case without resorting to more radical means. This is best used in the form of a ten per cent. emulsion in olive oil or pure glycerine, and should be repeated about once in two weeks until a cure is effected. Some cases of joint or bone tubercle will get well with but very little assistance.

Augusta Y., American, age fourteen, entered the Elliot February 5, 1892, with pain and swelling of right hip, and gave the following history: Her father died of consumption. While she was watering a horse at a little brook, about eight weeks before, she slipped and fell, striking her right hip on a stone. It hurt her but very little at the time, but in the course of a couple of weeks it began to be a little painful. It gradually grew worse

until about two weeks before she entered the hospital, when she took her bed.

She came to the Elliot on the 5th, and on the 8th we aspirated and took about two ounces of a gelatinous liquid from the hip joint. Slight extension was put on to the limb, and she was put on to cod liver oil and tonics, and iodine was used over the joint, and she soon began to improve. The pain left the hip and knee, and there was a slow but steady improvement without intermission until April 22, when she was dismissed well. This required but very little local assistance with tonics, etc., to effect a cure.

Guy R., American, age three, entered the Elliot April 14, 1894. His mother had just died of consumption. Some time previous he fell from a chair, and catching his foot in the rounds, he wrenched his ankle and injured in some way the lower end of the tibia of the right leg. A few weeks after a sore broke out a little above the ankle, and Dr. Hatch, of Wilton, cut down and found diseased bone, and sent him to the Elliot. On April 20 we cut down and found a distinct tubercular focus softening nearly all the cancellous tissue in the lower end of the tibia. The opening through the compact tissue was enlarged and the bone curetted, scraping out nearly all the cancellous tissue in the expanded portion of the bone. This was then filled with a ten per cent. paste of iodoform and lanolin, a large rubber tube inserted, and the external wound closed down on to it. Through this tube the olive oil emulsion was injected about once a week and syrup of the iodide of iron was given internally. The child is still in the hospital, but the wound is healed and the general health is most excellent. This required more active measures, and the results are most gratifying.

The next, Emma F., age fourteen, German, admitted to the Elliot July 27, 1892, with injury of the hip that began to cause her trouble a little more than three months previous. At the time of admission there were the ordinary symptoms of quite advanced hip disease. She was placed in bed and extension applied, but in a short time an iliac abscess pointed at the notch between the anterior superior and inferior spinous processes of the ilium. The diagnosis was then quite clear as hip disease with suppuration and perforation of the acetabulum and the internal periosteum, or peeling off of the internal periosteum, and pointing at this notch. The abscess was opened freely November 5, 1892, and fourteen ounces of pus discharged. It was cleansed thoroughly and often, but it burrowed down the course of the sartorius, about two thirds of the

distance to the knee, in spite of all efforts to heal it with ordinary antiseptic solutions. The patient lost flesh rapidly, became pale and anæmic, and the pulse became rapid, 100 to 120, and the temperature as high as 104°. She was rapidly losing ground when it was decided to resect the hip joint. This was done February 8, 1893. It was cut down on from the anterior aspect and the periosteum peeled back and the shaft sawed through three inches below the trochanter and the upper portion removed. We then learned that the acetabulum was badly diseased and perforated, and it was thoroughly scraped out and a portion of the rim together with some of the ilium posterior to the acetabulum was removed. The cavity was packed with iodoform gauze and the external wound partly closed, leaving an opening for the introduction of a Polk's uterine speculum, through which we packed the cavity every second or third day with iodoform gauze, and about eight pounds extension put on. A more rapid improvement in the general health is rarely witnessed than we got in this case. Suppuration was checked at once, and the temperature soon dropped to normal and the pulse steadily improved, while at the same time the cavity where the pus had burrowed along the sartorius rapidly healed, and in a few days we all agreed that our patient was on a safe road to recovery. She steadily gained in flesh, strength, and general condition until the last of May when a drainage-tube was put in, as it was nearly healed, and it was daily cleansed through this until about the first of July when it was allowed to close. She still improved until August 1, 1893, when she was dismissed. She has been able to get along at times with a cane, and she has had no ill turn in any way since.

My next, resection of the superior maxilla for sarcoma: Mr. U., age 59, American, retired, entered the Elliot September 5, 1893, and gave the following history: A tooth had troubled him for some time, which he had had extracted, and a few months following a growth projected down through the opening. This was removed, but in about three months it returned, while at the same time a tumor became apparent in the jaw above. He entered the hospital, and on September 7 the jaw, as you see it here, was removed: Patient on the back; an incision starting a little below the inner angle of the eye was carried down the side of the nose to the ala, thence around to the median line and down through the lip. During this an assistant compressed the left facial artery and the upper part of the wound with a sponge, while a second compressed the coronary arteries at the two angles of the mouth. Then all bleeding vessels were secured. Then an incision was carried

from the starting point of the first, horizontally outward along the lower margin of the orbit, nearly across the malar bone. The cheek flap was then dissected back, the head being inclined a little to the left to prevent the blood from entering the mouth. The bone was then sawed, commencing at the nasal cavity and sawing across the nasal process and just below the margin of the orbit, nearly across the malar bone, thence down. The tumor impinging on the median line, we now sawed through the nasal septum into the right cavity nearly back to the soft palate; then, beginning in front, we sawed through from before backward just to the right of the septum, as far as the soft palate, leaving this portion until the very last on account of hemorrhage. A transverse incision was then made, separating the soft from the hard palate, and the bone seized with strong forceps and wrenched from its position, cutting with scissors what few attachments remained. The head was turned to the left and hot water used until the bleeding nearly stopped, then the cheek flap was turned back and sewed in place. Primary union and rapid recovery without an unfavorable symptom were the results.

This is usually considered a dangerous operation on account of blood getting into the air passages, so much so that tracheotomy has often been performed as a preliminary step. For this reason I report this method of operating, for I believe it is a little different from any method laid down in our books, and the best course that can be pursued to avoid this danger unless we perform tracheotomy or use Trendelenburg's canula.

REPORT OF A CASE OF EXCISION OF THE ASTRAGALUS.

BY ROBERT BURNS, M. D., PLYMOUTH.

As we see more and more clearly from year to year, the advance in modern surgical methods enables us to operate fearlessly where there was, only a short time ago, grave danger in so doing. In no branch is this more marked than in bone surgery. The results shown in the able paper just read are conclusive of the progress that has been made.

I have been asked to report the following case:

On November 10, 1892, Warren B., a healthy man of middle age, was standing on a track in the railway yard when the shifter backing down on him, struck, and threw him on his face. The tender, fire-box and most of the engine passed over him. I reached him about one hour after the accident, and found him in severe shock. Heart stimulants were at once administered and continued occasionally until he had rallied somewhat from the extreme shock.

On examination I found (1) that there were several long scalp wounds. (2) That the left arm hung, at about four inches below the shoulder, by a few crushed shreds of tissue and skin. (3) That there was a bad fracture in middle third of left leg, which was comminuted for a distance of from four to six inches. (4) That the astragalus of right foot was fractured and the ankle distorted, the foot thereby forced into a marked position of varus.

As soon as the patient's condition would allow—proper assistance having been procured and due preparation having been made meanwhile—the injured arm was amputated just below the shoulder joint, under strict antiseptic precautions, and the stump was dressed with gauze sterilized by baking. At the same time the necessary attention was given the scalp wounds and the left leg was put up in a strapped pillow dressing, which I believe to be a safe protection where the swelling is consider-

able and there is great danger of the fracture becoming compound.

On giving my attention to the right ankle I found that, even under full anaesthesia, it could not be reduced by manipulation or even by guarded force, and the patient's condition did not permit of further (surgical) interference at this time. The pressure over external malleolus was so great that side splints were applied to remove the tension. On the next day the splints were removed and cold applications were made.

On the fifth day Dr. Conn saw the patient in consultation. An incision was made just below the external malleolus, the Tendo Achillis having been first cut subcutaneously. A large external fragment of the astragalus, almost wholly free from its attachments, irregular in shape, and rotated upon its axis in such a way as to render replacement impossible, was easily removed. On the inner side of foot I found several small pieces of bone, and also a long irregular fragment, the longest diameter of which was antero-posterior firmly bound in its normal position. The ligaments were so strong that an incision was made on inner side of foot, and the attachments quickly severed before removal could be effected. After thorough antiseptic irrigation a heavy baked gauze dressing with side splints was applied. Following this operation there was but little pain and but slight inflammation, though ultimately a large circular slough formed, owing to the nature of the injury and the degree of tension over and below the external malleolus. When this slough separated the joint was left freely open. In about two months' time the joint had closed and the wound had granulated so that a Tiersch skin-grafting was done, the graft taking over the entire surface.

As soon as it was deemed advisable light plaster splints were put upon left leg and right ankle, fenestra being cut over wounds and sloughing surfaces for irrigation and application of dressings. The plaster bandages were made with washed crinoline.

In the history of this whole case there was no pus. The shoulder healed by first intention, the dressings having been disturbed but twice. On the thirteenth day, the date of second dressing, the wound had entirely healed. The ankle joint was open for a long time, but never was a drop of pus to be found.

It has now been over a year and a half since the date of injury. The patient is walking about his farm attending to his work.

He was greatly handicapped in beginning to walk by the loss of the left arm, which prevented the use of a crutch on that side, and by the injury to the left leg, which also greatly retarded his recovery.

The foot was forced over so far and fixed so firmly that there were but two operations to be considered, *i. e.*, exsection or amputation. We chose the former and the result is satisfactory.

I am certain that I should not hesitate under similar conditions, but should at once strongly advise the removal of the fractured bone. The large fragment was so torn from its attachment and was so free that necrosis which so often results when the irreducible fragment is not removed, is readily explained.

In the spring of 1888 I was called to examine D. C., a boy of eight years, who had probable tuberculous disease of the astragalus, the bone being partially destroyed. I completely removed the remainder of the bone and the boy recovered with a movable joint. He now runs and plays with his mates with a scarcely perceptible limp. No tenotomy was done in this case and there was constant tendency to drawing up of the heel. The cutting of the Tendo Achillis greatly simplifies the operation, and in preventing spasm and contraction assists in subsequent treatment. I believe that this should be done in all cases.

It is evident that the removal of the crushed and diseased bone fragments of the astragalus through one lateral incision may be by no means easy in all cases. But by making the second lateral incision it can usually be effected readily and quickly, and the subsequent irrigation can be made more effectively. One of the cuts should be allowed to heal by first intention.

In many of our cases it is impossible to secure an aseptic condition of the wounds. The patient may be in a state of severe shock, where to do too much is to destroy his best chance. Nevertheless, I believe that the emergency bag of every surgeon should contain a hand brush, and that he who uses it most unsparingly will have the fewest suppurating wounds, and will meet with the best success. I have also great faith in antiseptic irrigation, continued as long as may be possible, followed by heavy sterilized dressings. If you have a wound of your own making or one you believe to be aseptic, seal it with heavy dressings and do not disturb it without good reason.

But the wounds with which we have to deal are often crushed and begrimed with dust and dirt and are in the worst possible condition for immediate union. On the other hand the danger of sepsis will be at a minimum if the surgeon works with a full and realizing sense of his duty to his patient and a due sense of the magnitude of his responsibilities.

The fracture case is interesting as it is rare, being met most often in railway surgery. The satisfactory result proves the

wisdom of removing the astragalus where there is distortion with irreducible displacement of a fragment. When we consider the severe multiple injuries in this case and the result obtained, it is proven that when the deformity is considerable, and fracture irreducible, we should exsect with a fair prospect of a useful foot.

Dr. Conn.—As the last writer has used my name describing the case, I will say a word with reference to it, inasmuch as I saw it several times and was pleased with the results. I am satisfied that this is the best line of treatment for cases of that description, The doctor did not emphasize one point. It is easy enough to have a fracture of the astragalus; but to have a fracture of the astragalus with dislocation, is another thing entirely. The ordinary fracture of the astragalus, where a person falling or jumping from a considerable height, strikes upon one or both feet, a simple fracture of the astragalus, without much displacement, unless the condyles are driven down over the foot, is a slight matter, as it can be replaced and put in a splint so as generally to get a fairly good recovery. But with fracture and dislocation, whereby one or more fragments of the astragalus is turned completely over, the attachments nearly all severed, I believe it to be impossible to return the pieces of the bone back into their places again, even after you make an incision. In that case I do not see anything to be done except to remove the pieces, and get as good results as possible, and, as shown by the cases of Dr. Burns, there is sufficient motion of the ankle for the purpose of walking, and it is much better than a wooden leg, and consequently takes the place of amputation.

Another point in regard to fracture with dislocation—so far as I have seen reports of such cases, some six or eight in number, they have all been railway injuries, and of that nature where the patient is rolled under a car or engine, in a small space, whereby apparently the foot is twisted until the fracture takes place and the bone is turned over.

This has been discussed in the meetings of the National Association of Railway Surgeons, and the only cases I have heard of in that association are some half dozen, all reported by railway surgeons, and all of the same nature of injury, and scarcely any of them have been of that injury alone,—there have been

other multiple injuries, like the case reported by Dr. Burns,—some of them of minor importance, it is true, but at the same time complicating the case very much, not only in the loss of blood, but in the greater danger of collapse from the greater number of injuries.

In Dr. Burns's case it was necessary to operate on the arm at once. It was done the first day, and the depression was so great that it was not expedient to go any further. He was left until reaction had taken place, and until probably the wound made in the left arm had substantially closed in, so that there was no great danger from that. After the resection of the astragalus there was the sloughing which he speaks of, which was of that portion over the malleolus. That was put upon such a strain that it actually destroyed the skin, which over that point looked like a piece of leather at the time of operation, and it naturally had to sepurate. But it showed in this case, as it does in other that you may get sepuration of the tissues of the skin, and still no pus. It simply separates, as you would run around it with the knife, only slower. There is no pus formed, nothing to be wiped away, nothing to be washed away.

As to the cases which Dr. Adams has reported of ununited fracture, I believe that many times it will be necessary to operate, cutting down upon the bone, resecting and binding together, as the case may be. Of course, when you cut down upon the bone you remove all the tissues which are found between the ends of the bone. In the western section of our country, when there is a fracture that is oblique and compound, the soft tissues are turned back, the bone drilled, and a wire nail is driven through, just as you bring pieces of board together, and it is left there sufficient time for union to take place without any trouble whatever. It is far easier to perform than wiring, and equally successful.

Among the later inventions—as we must call them, because anything which pertains to something new is called an invention—is the bringing together of the patella, in which a subcutaneous ligature of silk is passed beneath, and coming out is repassed through the same opening over the patella. I think in some instances that must be good treatment, and being done under proper antiseptic precautions there can be no trouble.

PROF. SMITH.—In reference to excision of the astragalus, I think of a case we had in the hospital at Hanover this spring, which illustrates the impunity with which the ankle may be treated under thorough antiseptic precautions. We had a young man brought in who had got his ankle on to a circular saw. As he was leaning over to pick up a stick he threw his foot up and his ankle came on the saw, so that the edge of it took off the lower end of the internal malleolus. It cut off two tendons and the posterior tibial artery. It did not cut the nerve; but it went clear into the joint, so that the articular surface of the astragalus could be seen. Dr. Gilman Frost, who was called to the case, had tied the artery and washed the wound thoroughly. It hardly seemed possible that the man could save his joint. There was the usual amount of saw-dust, dirt, and other things ground in. But we did what we could; tied the tendons together and after using the antiseptic solutions very freely, so we thought we were as secure as we could be, we sewed the wound up tight. It was well covered with gauze and put up in splints. The dressing was not taken off for four or five days. No rise of temperature. When the dressing was removed there was no pus. This treatment was continued. After a time he was put in plaster. I have forgotten how long it was before the wound was completely healed—a couple of weeks, perhaps. But in the meantime there was not a particle of pus. The man was entirely comfortable most of the time. The only rise in temperature he got was during a few days when he had a slight attack of tonsilitis. The wound healed up, the plaster was taken off, and he was discharged able to move his ankle, and the prospect was that he would get a good, serviceable ankle. This illustrates what can be done when the tissues are in good health. In this case that Dr. Burns gives, the condition of the man must have been good in order to have so prompt healing. If there is diseased condition the prospect of course is not so good.

We had one case of excision of the scaphoid bone in the last year in the hospital, in which there was probably tuberculous disease of the bone. We thought we had gotten everything out. The wound healed up, I think, entirely. There might have been a small opening remaining. But at all events the

man thought he was entirely well, went home, but within a year the disease had made considerable progress in other bones, and he had to come back and have his leg amputated.

So when we do our best, as Dr. Adams says, we may not succeed. It is in the healthy cases that we have the most encouragement to attempt almost anything.

Dr. Hill.—Dr. Burns's remarks remind me of some cases which I have seen in which the operation was performed, as I had no doubt then and have not now, too early, before reaction took place. I have known of more than one case where amputation has taken place so soon after injury and prior to reaction that the patient succumbed and died. A case occurred some years ago where a man passing alongside of an engine and oiling the axles fell in and the wheels ran over him, cutting one leg almost off, hurting his shoulder, arm, and head very much, and giving him a tremendous shock. I was sent for to amputate the limb. I saw it would not do; and I urged the doctor in attendance to stand by me night and day and feed him on brandy and milk until the next day; and so the second, third, and fourth day. Reaction did not take place until the fourth day. We then amputated the limb and the man made a good recovery. I say do not operate in any case until reaction has come. I do not know of any recent case where that has been done, but it is sometimes done.

THEN AND NOW,

OR GLIMPSES OF FIFTY YEARS IN THE MEDICAL PROFESSION.

BY CYRUS K. KELLEY, M. D., PLYMOUTH.

Mr. President and Fellows of the New Hampshire Medical Society: It is with mingled feelings of pleasure and regret that I attempt to address this venerable association on its one hundred and third anniversary—pleasure, that I stand before not only professional, but many personal friends as well, who, I feel sure, will accord me a degree of charity due a poor "earthborn companion and fellow mortal," and which is said to "hide a multitude of sins." We are engaged in a common cause, which calls forth the noblest qualities of mind and heart, a cause in which many of the brightest intellects, profoundest thinkers, and investigators the world has known have spent their long and useful lives. Their memory will be cherished for all time for the inestimable service they have conferred upon the human race, and for the unmeasured good they have accomplished in mitigating human suffering. Regret, that I feel myself so incompetent to present such matter, as you have a right to expect, in order to add my mite to the common stock of wisdom and professional learning deposited in, and worthy of a place in, the archives of this association, or to assist in advancing the *object* this society so nobly and constantly endeavors to achieve.

In what I have to say, I shall confine myself mainly to recalling a few incidents and reminiscences of the last fifty years, in which I have been connected with the profession of medicine and surgery, and in contrasting methods then in vogue with what they are to-day. In attempting to do this, I do not expect to present anything new to the older members of this

society, who, like myself, began the laborious life of a country doctor a half century ago, but it may serve to *amuse* the younger members for the moment, and if I succeed, it is all I can expect in this very imperfect paper.

The facilities for acquiring a medical and surgical education have been increasing since the earliest days of medical knowledge, but probably never so rapidly as during the last half century. We are amazed, when we take into account the discoveries in medicine and their adaptation to the relief and cure of disease, and the wonderful inventions and appliances within our reach, brought into use in the art of surgery within this period.

A half century ago, physicians were as honest, and worked as hard as now, and with comparatively very few of the physical comforts which the average country doctor enjoys at the present time, and which cheer and lighten, in a degree, his laborious and too often thankless task. His rides were long and tedious, over rough roads by day and night. Small fees had to satisfy him, as he could not better the conditions by which he found himself environed.

As an illustration of the small reward of the country doctor in a back town, and which to-day would be considered so inadequate for the wear and tear of body and mind suffered in his profession, let me relate an experience of Dr. Dixi Crosby, who practised medicine in my native town of Gilmanton over fifty years ago. One winter a snow-storm came on, accompanied with terrific wind, which piled the snow in huge drifts, and for three days made all ordinary means of travel upon the highways impossible. During this time Dr. Crosby travelled *thirty miles* on snow shoes, and in this way visited all his patients. He received in these three days the sum of one dollar in cash, and charged *sixteen* dollars and twenty-five cents for his entire work.

What would my young medical friends present think of such a hardship and insignificant remuneration for such a hard, laborious three days' work in professional duties in this year of grace, eighteen hundred and ninety-four?

The average country doctor was poor as well as his patrons, and the only way was to work hard, live economically, and die

leaving little or nothing to his family. Now, it is pleasant to know, fees are larger, services more fully appreciated, there are less poor and worthless bills, good ones are paid more promptly, and financial conditions are vastly improved. During the first fifteen years of my practice I never received but three dollars for an obstetric case, unless detained over twenty-four hours, and in many cases had to wait from six months to several years for my pay for the services rendered. Fifty cents a visit anywhere within a mile, and a shilling for each additional mile, were the charges fifty years ago.

The country doctor in those days did nearly all that part of dentistry which consisted of extracting troublesome teeth, the fee for which was ninepence when paid at the time; if charged that was usually the end of it, and the doctor received nothing. An old doctor once told me that he "pulled," as he called it, over one thousand teeth in one year with the old-fashioned cant-hook—that abominable instrument of torture—and if he had not been so much like the traditional George who could not tell a *lie*, I should be tempted to think *he* lied—under a *mistake*, at least. I used to think the nine penny fee was due to the "pulled" rather than the "puller," when the pain of extracting was taken into account, and did not so much blame the patient after all for not paying for the torture he suffered in the operation.

A few doctors in olden times made great progress in the art of medicine and surgery, and many discoveries and inventions were brought to the notice of the profession; but the investigators were not numerous in those days compared with the number now. Money was hard to get, and the average country doctor could not afford the expense of buying many books to better inform himself in medicine, or instruments and appliances for treating surgical cases. Now conditions are all changed for the better. There is more money to pay the doctor than formerly, which enables him to buy books, instruments, and whatever is necessary for the successful prosecution of the practice of the medical and surgical art. He is able to dress better, ride in better conveyances, live in better houses, and, with the increasing wealth of the world, to enjoy life in a much greater degree than in olden times, and feel that he may

bequeath something to those he leaves behind him when he departs.

The drinking habit was somewhat common in days gone by, and physicians had great temptations to indulge in that form of dissipation. I regret to say that within my own remembrance some of the brightest minds in the profession went out in darkness from that habit, before the meridian of life was reached. Now, so far as my observation goes, the habitual drinker in our ranks is the exception to the rule.

In former times physicians gave very large doses of medicines, and in a very crude form compared with the remedies that are now in use. As I remember, the lancet, the cant-hook for teeth, calomel, opium, tartar emetic, jalap, rhubarb, ipecac, epsom salts, gentian root, senna leaves, anise seed, lunar caustic, chamomile flowers, Dover powders, carbonate of soda, tartaric acid, lead plasters, diachylum, Burgundy pitch, gum guaiac, gum kino, laudanum, paregoric, James's powder, elix pro., and *squirting cucumber* constituted the principal stock in trade of the country doctor, with the addition of Spanish flies for blistering. Usually the first thing to do when called to a patient was to bleed, then give a dose of calomel and jalap, and if no operation from the bowels followed in a certain time, an enema was given by means of the pen-end of a goose quill tied within the neck of an inflated hog's-bladder—which was used for that purpose as syringes were scarce in those days—the injection being repeated until the object was accomplished. I never gave one in that way myself, but saw it done once by an old doctor of my acquaintance.

I was called in consultation, in the second year of my practice—the first one, then, of my professional life—and with your indulgence will briefly relate the case. On my arrival I found a man in great distress in his bowels, with constant vomiting, and no movement for seventy-two hours (as I learned from the physician in attendance, who had been with him during all that time). He said he had given the man everything he could *think* of, but without giving any relief; had bled him three times to faintness; had given half a dozen doses of calomel and jalap to move the bowels, and large and frequent doses of opium to relieve pain, but to no purpose.

The poor man was faint from loss of blood and drastic drugs given him, and seemed ready to die—and who wonders? I asked the doctor what the cause of the stoppage was, and he said he did not know, but he was terribly "plugged up," as he called it, somewhere. It occurred to me that it might be intussusception, though I had never met a case of this disease at that time. Seeing an old-fashioned bellows hanging in the corner, I asked permission of the doctor to use it. He consented, but said it would do no good, as the man must die, for he had exhausted all his remedies in trying to cure him. I lost no time, but oiled the nozzle, introduced it, and began to pump away—gently at first—and kept it up for about three minutes, when I had the satisfaction of getting a whole lapful of the contents of the bowels. Immediate relief to the sufferer followed, and all were happy except myself; and I was afterwards, when I had cleaned up from the deluge that nearly overwhelmed me.

A novel instrument, indeed, to use in such a case, and one which I have never heard of using for this purpose, either before or since. But it unfolded the intestine, and verifies the old adage that "Necessity is the mother of invention," and "Guess-work is as good as any when it hits right." I *guessed* it was a case of intussusception, and I guess *now* it was. My feelings were like those of Jack Falstaff when the Merry Wives of Windsor were conveying him away in the bucking-basket of foul clothes. He said it was "the vilest compound of villainous smells that ever offended nostril." When the kind old doctor saw what had happened, he exclaimed, "Sam Slick" like, "I vow if that do n't beat all natur'!"

What a change in the Materica Medica during the last half century! Now, we use but very few crude remedies, as they may be called, such as have been enumerated, and the doses are very greatly reduced, when prescribed, thanks to the progress of the science of pharmacy. Dr. John Carr, formerly of Sanbornton, where he spent his long and useful life, and who was an honored member of this society for a great many years, told me once that he used one hundred pounds of Peruvian bark in his practice in one year, and, by the way, he was one of the earliest to adopt the tonic and sustaining treatment in severe febrile diseases, and, after this radical innovation, saved

a very large percentage of his patients, while his neighbors persisted in depletion and lost nearly all. Bleeding was almost universal fifty, and practised by many even thirty, years ago. Now, who bleeds? No well informed physician in his right mind would think of such a proceeding, except under very extraordinary circumstances. Perhaps in the early attack of apoplexy it might be the proper thing to do, but, I must say, it accomplished nothing in any case that has ever come under my observation. A prominent member of this society stated to me, not long since, that he had never seen the operation of blood letting performed in his life, and I understand that he has a large and lucrative practice in one of the largest cities in our state. It was no uncommon thing, in my experience, no longer ago than thirty or thirty-five years, for men and women to come to me in the spring of the year and ask to be bled, as they had been for years by Dr. So-and-So, "as their blood always got 'thick' at this time of year, and did n't run well in their veins and arteries"; and on rolling up the sleeve the old scars were so thick that they were almost piled up on top of each other, so frequently had the lancet been used. I do not remember of bleeding in a single instance for the last twenty-five years, and I do n't hear of my neighbors doing it. Doctors, in olden times, were not *all* San-grados, but some of them strongly resembled that celebrated quack, in drawing blood, but gave less warm water, in treating their patients.

The methods of investigating diseases of the heart and lungs, fifty years ago, were far behind those of to-day, and the conclusions arrived at were a little better than guess work. I remember the first stethoscope I ever saw. It was made of paper, rolled into the shape of a cone, the base being applied to the chest and the apex to the ear. This ingenious device, percussion then not being well understood, except by experts, was the only physical aid we possessed, in determining the condition of the organs of the chest. Possibly it was better than *nothing*, but very inferior to the means at hand to-day, which enable us to tell very accurately, the pathological condition of the lungs and heart.

What attention was paid to the kidneys, a half century ago, in our investigation of diseases? If I remember rightly, not

much stress was laid on the importance of this organ, in the lecture room, and the books gave very little information upon the subject. Now, no sound and reliable life insurance company will take a risk without a thorough examination and analysis of the urine, and if not found of the proper specific gravity and chemical constituency, the applicant is rejected. The kidney is now known to be the seat of many diseases, whose early invasion the physician of our day easily detects.

Fifty years ago, ether and chloroform were unknown as agents for the prevention and relief of pain. What a debt of gratitude the profession and the world owe to Morton or Jackson, or both, for their happy discovery! Then, opium was the only soother of pain, and that an imperfect one. Now, the most painful and dangerous surgical operations are performed while the patient is under the influence of these anæsthetics, and oblivious to all surroundings, escaping all the agony and suffering incident to such proceedings. What a precious boon to the human race!

The advancement in the art of surgery has kept pace with that of medicine during the last half century, and we have almost ceased to wonder at what is now accomplished, however formidable. I well remember the time when Dr. Dixi Crosby amputated at the shoulder joint, removing both the clavicle and scapula in the operation. It was thought at that time a wonderful surgical achievement, and it gave him the chair of surgery at Dartmouth, which he filled, I believe, till his death. Dr. Crosby was a bold operator and equally able physician, and a leading member of the profession for many years, but he, like all other doctors, occasionally made a mistake, as the following incident will show. During one of his lectures at Hanover, a man presented himself for the removal of a cancer on the lip, to be performed before the class. The doctor seated the patient in the operating chair and said: "Gentlemen, here is a man with a cancer on the lip. Now, gentlemen, please remember that cancer of the lip is always produced by the habitual smoking of a clay pipe. You smoke, do you not, sir?" The man was a mortal hater of tobacco, and in an angry tone replied, "I never smoked in my life." The noise and dust that followed at Dr. Crosby's expense can better be imagined than described.

As soon as he could be heard, not in the least disturbed, the doctor told the class that this case was the only exception to what he had before stated, and it proved the rule, and said he was right. Like Goldsmith's schoolmaster, "altho' vanquished, he could argue still." Nothing ever daunted him, under any circumstances. In abdomidal surgery little was known in former times. When Amos Twitchell opened the abdominal cavity and cured a case of intussusception, it was thought a marvellous thing, and the operation was heralded all over New England, and Dr. Twitchell was one of the surgical lions of the day. When the case was reported to Prof. R. D. Muzzey, then of Hanover, he could hardly believe it, and exclaimed, "Nobody but Amos Twitchell would have ever thought of such a thing." You will pardon me if I say, by way of parenthesis, if Dr. Twitchell had happened to have thought of an old bellows he might have blown his patient up, curing him, as in the case before referred to, and he might not have had to resort to the knife, as he did, to effect a cure. When Dr. Muzzey showed Sir Astley Cooper a specimen of union of fracture within the capsular ligament of the hip joint, it was pronounced wonderful, and Sir Astley was much taken back, as he had stated in his works on surgery that it had never been known to occur, and probably never would. Now, we have ceased to wonder at anything in the line of surgical results.

In earlier times ovariotomy was unknown; now it is an every day occurrence in hospital and private practice, and the grand results are almost beyond computation in the saving of human life. The late brilliant Prof. Edmund R. Peaslee, whose memory we all love to cherish, and who adorned this society many years, said at one of our meetings that he had operated for ovariotomy seventy-six times, if I remember rightly, and with a loss of only three cases,—a record then unequaled and surpassed, I believe, by no other American surgeon in that department of practice. We older members of this society remember Dr. Peaslee as looking like a woman dressed in men's clothes, only a little taller, so delicate were his features and complexion,—so modest and retiring in manner that it was hard to believe he could be so lion-hearted on occa-

sions as he was. With his clear head and steady hand, he was always ready to meet anything he was called upon to perform, and whatever he did, he did well. In his death the profession sustained a great loss. I would like to relate an anecdote of him, an incident which occurred at one of our annual meetings in this city many years ago, but will refer you to Dr. Hill, who was an interested party, for the particulars, as the doctor is a very obliging man, and can tell you all about it, and entertain you far better than I can.

Till within a comparatively recent date, clinical thermometers and hypodermic syringes were in but little use. Now, no well equipped physician thinks of going his daily rounds without these valuable assistants, and could hardly do without either. The little tell-tale thermometer gives many a hint as to what may be the issue, either for weal or woe, in our prognosis of the case under treatment, and the subcutaneous injection gives relief in numerous cases, when the stomach will not tolerate remedies taken by the mouth, and is of invaluable service to the profession in many other ways.

Another, and I believe one of the most important and encouraging innovations in the history of the medical profession, is the advent of regularly educated female physicians to our ranks. We are pleased to recognize them on equal terms as practitioners of our art, and to meet them in consultation precisely as though they were of the opposite sex. Within the memory of most of us a "woman doctor" was looked upon as a curiosity, if not with aversion by many professional wiseacres. When the subject was discussed of admitting them into the Massachusetts Medical Society, a few years ago, the fiercest opposition was shown by many of its members. The fight waxed hot for a long time, and they were eventually admitted, but only after much angry discussion. To-day they adorn that old, and in many respects eminent, society, and the best of it all is, they are there to stay. I am proud to say that our own association is no less fortunate in this respect, and I believe we all feel an honest pride in the fact that some of the brightest and best educated and most active members of the New Hampshire Medical Society are women, who command our highest respect for their moral, social, and professional qualities, pur-

suing the even tenor of their way in their chosen calling, and enjoying the confidence of the communities in which they reside, each having a large and lucrative practice, side by side with the best in our ranks of the opposite sex. Some of the best digested papers presented to this society in later years have been read by female physicians. They received, as they deserved, the approbation and applause of all who listened to them. But the efforts of female physicians are not confined to the healing art in medicine alone. There are many expert surgeons as well, and many difficult and grave operations are performed by them, in hospitals and private practice. A physician of twenty years' observation, a graduate of high standing of the Harvard Medical College, told me a few months ago he had just witnessed some of the finest work he ever saw in surgery, performed by a female surgeon, in the Woman's hospital, in Boston. A steady hand, cool head, and perfect knowledge of the surgical anatomy of the parts, characterized the whole operation, from the beginning to the close,—qualities and attainments it would not be wicked to envy by any male surgeon. When such facts as these are demonstrated, and such operations performed by a woman, who shall say that she is not entitled to full recognition by the sterner sex, in the development and demonstration of all the talents that the Almighty has bestowed upon her, in any of the professions hitherto monopolized by man? So I say, Welcome, thrice welcome to our ranks, all women of sound common sense, a thorough education, and possessing the traits that ennoble a high minded and conscientious physician, true to herself and her profession. I should like to live to see the time when a female physician, and a member of this society for years, will fill the place our honored president occupies to-day, and placed there by the unanimous voice of this venerable association, and I do not believe that its deliberations and interests will suffer by the innovation, or that dignity and executive ability will be less manifest than that shown by the distinguished presiding officers who have preceded her in that honorable position.

Thus, Mr. President and Fellows, I have alluded, in a very desultory manner, to a few of the more prominent changes that

have taken place in our profession during the last half century. Very many more of equal interest might be cited, but I forbear, lest I weary your patience, and will lay down the pen, to be taken up by some far abler person, fifty years hence, who shall record still greater wonders and changes in the medical and surgical world than I have been able to present to you in what I feel to be a very feeble manner. I can only say what St. Peter said, when, at the beautiful gate of the temple, the lame man asked alms of him: "Silver and gold have I none, but such as I have give I unto thee." Fifty years hence! How do these words sound in the ears of us who are about to die? who have toiled and labored for a habitation and a name, in one of the most important and exacting callings known to man? Alas! not one of us who have borne the heat and burden of the long period will be left upon the earth, but will have passed to that bourne from which no traveller returns, and the places we occupy to-day will be filled, possibly by a few now present, but mainly by a generation yet unborn. But let us hope we have not lived wholly in vain, that we have done some good in the world, and have made it a little better for our having lived in it. If the record cannot show this, we might as well never have been born. I will close by quoting the sublime and familiar language of another:

"Let us so live that when life's fitful fever is o'er,
That when our summons comes to join
The innumerable caravan that moves
To the pale realms of shade where each shall take
His chamber in the silent halls of death,
We go not like the quarry slave at night,
Scourged to his dungeon, but, sustained and soothed
By an unfaltering trust, approach our grave
Like one who wraps the drapery of his couch
About him and lies down to pleasant dreams."

DISSERTATION ON EMPYEMA.

BY WM. H. LYONS, M. D., MANCHESTER.

I have selected empyema as the subject of this report, not because I have had any special experience in this class of cases, but because it seems to me that a distinct advance has been made in our knowledge of the etiology and the therapeutics of this condition. The marked difference in the clinical history of these cases made it probable that there was more than one type of this disease, and the results of scientific study in the last few years have confirmed this view. Devoted workers who have had hundreds of cases under observation have made a thorough study of this disease, and it seems to me more profitable to present for your consideration the results of their labors than to attempt to draw any conclusions from the small number of cases which I would be able to collect.

Formerly empyema was regarded as a purulent pleurisy, and that was all. The study of bacteriology has now not only classified the different forms of this disease, but has also furnished us definite therapeutic indications. At the present time we are able to distinguish two classes of cases:

A. That class in which the exudate is infected by only one class of pyogenic organism; and

B. That in which two or more species of microbes are present at the same time.

The first group may be sub-divided into the following five forms:

1. Infection by pneumo-cocci.
2. Infection by strepto-cocci.
3. Infection by tubercle bacilli.
4. Infection by staphylo-cocci.
5. Infection by Eberth's bacilli.

The second group includes these three forms:

1. The exudate may contain both tubercle bacilli and strepto-cocci.

2. It may contain strepto-cocci and staphylo-cocci.

3. It may contain strepto-cocci and saprophytic bacteria.

Of these forms there are three which are worthy of special attention, as being the most common and presenting very marked differences in their symptoms. They are,—

1. Empyema from infection with pneumo-cocci.

2. Empyema from infection with strepto-cocci.

3. Empyema from infection with tubercle bacilli.

The majority of pleurisies due to infection by pneumo-cocci are secondary, and generally are secondary to pneumonia. They occur most frequently in children and young adults. When primary, this pleurisy has a strong, severe invasion. There is a rapid rise of temperature, much pain, and the signs of effusion appear very shortly. If secondary, it develops either during the course of the primary disease or during convalescence. There is the same quick rise of temperature, followed by a rapid decline if the effusion is removed. Chills and hectic fever are not ordinarily present in this form, or if present are the result of some complication. The amount of the effusion offers no guide to the gravity of the case. It is in these cases that the effusion, even though purulent, sometimes undergoes resorption, and there is a great tendency to a spontaneous evacuation through a bronchus or through the thoracic wall if unrelieved by an operation.

The second form is that caused by infection with strepto-cocci. It is almost always secondary. If it develops during the course of the primary disease it may go unnoticed till the quantity of the effusion calls attention to the condition. The temperature rises rapidly, even to 105° F., and later becomes very irregular, taking the course of a regular suppurative fever. There is great constitutional disturbance—repeated chills, profuse sweating, and grave disturbance of digestion. The tendency to reaccumulation of this effusion is characteristic of this type of empyema, and it is rarely that spontaneous evacuation takes place.

The tubercular variety of empyema is so different clinically

from the preceding forms as to seem like another disease. Its onset is very insidious, the patient not infrequently neglecting to seek medical advice till the effusion has reached such a point as greatly to embarrass the respiration. The effusion is at first sero-fibrinous, and in many cases is absorbed, only to reappear later with a renewal of the original symptoms. It is accompanied by great prostration and debility. The patient becomes markedly anaemic and the digestive and nutritive functions are much disturbed. A most inexplicable fact in connection with this form of the disease is that the exudate is very commonly sterile, as shown by culture experiments. Nevertheless the injection of this apparently sterile fluid into the peritoneal cavity of animals has been frequently followed by a tubercular peritonitis. It must also be noted that if a tuberculous subject be attacked by pleurisy it is not necessarily the tubercular form which I have just described. It may be either of the other forms, and their course will then probably be modified by the antecedent tubercular condition.

It would not be possible within the limits of this paper to speak at length of all the varieties of empyema which I have mentioned, and I will pass on to a few remarks on the treatment of this affection.

What should be the treatment of the pleurisy before effusion has taken place? In the tubercular form there can be but little question that a most thorough tonic and hygienic treatment is most likely to prove successful, especial care being given to the nutrition of the patient.

But when we come to the sthenic forms of pleurisy, there is a most marked diversity of opinion concerning the proper treatment. The only explanation which I can offer for the widely differing views of doctors of undoubted ability lies in the fact that long familiarity with a particular mode of treatment gives better results to its devotees than it does to his confreres who are less accustomed to its use. There are very many who believe firmly that no amount of medical treatment can prevent the formation of an effusion. There are many others who believe just as honestly that efficient treatment will surely prevent such a result. My own belief is that we should zealously employ the agents which are commonly regarded as serviceable in

this direction, and if we are successful, at least we will be without reproach. The pain, which is often intense, demands morphine, and when practicable it is best given hypodermically. Dry cupping is often a very useful adjurant and in the milder cases may suffice alone. We know that accompanying the rheumatic diathesis there is a strong tendency toward inflammation of the various serous membranes. Hence in such subjects we would do well to try the effect of large doses of the salicylate of soda. I do not believe that many of the older practitioners would care to discard their trustworthy Dover's powder for the more modern antipyetics in the treatment of this disease, and I think we may follow in their footsteps with perfect confidence. Care should be taken that the skin and kidneys do not fail to properly perform their functions, and here again the time-honored remedies are as reliable as any.

But if, in spite of our endeavors to prevent it, the effusion takes place, what further is there to be done? It has been demonstrated beyond question that a serous effusion has very frequently been converted into a purulent one by the operation of tapping, even when the strictest precautions are taken to avoid infection. Therefore I think that when we have an effusion which is not causing urgent symptoms and is not increasing too rapidly, we should strive to accomplish its resorption by such means as repeated blistering and the free use of sulphate of magnesia, which I believe to be very efficient. But if there be already a purulent effusion, there is but one proper treatment, viz.: opening and thorough drainage. There are many interesting questions in this connection, as to the time when the operation should be performed, whether irrigation is necessary or harmful, whether it is necessary to remove a portion of the rib or not, which is the best place at which to make an opening, and whether more than one opening is necessary.

These questions can properly be answered, it seems to me, only by considering them in relation to each particular case, having in mind that to ensure success the opening must be free and the drainage thorough.

POTABLE WATER.

BY EDWIN BARTLETT, M. D., DARTMOUTH COLLEGE.

Potable water is drinking water. Drinking water is held to the same high standard as Cæsar's wife. But water after it has left the heavens and started on its earthly career, not only goes downwards, but keeps bad company ; it consorts with the effete, the putrescent, the excrete, the vegetable extract and the soluble mineral. The rank slops from the kitchen sink, the rich leaching of the neglected barn-yard, the flushings from the water-closet, the dirty waste from the factory, the drainage from the grave-yard on the hill, the products from vegetable and animal life and death, are all received into the liberal water courses. And from below, the salt beds, the iron ores, the epsom salts and the lime deposits are drawn along by its solvent power. The deadly typhoid bacillus, the ovum of the tape-worm, the beneficent nitrifying bacterium, find a temporary home in its all-welcoming current. And all the gases or fluids occasionally or constantly in the air, are greedily niched into its surface.

In populated districts the presumption is against its purity ; while in upland springs where only the sky and unoccupied land are above the presumption is favorable.

SOURCE OF DRINKING WATER.

For drinking purposes water is taken from wells and springs, and from reservoirs, either natural or artificial, of surface water.

A well is a hole in the ground, and its contents may be the unfiltered drainage from a filthy surface, or well filtered and oxidized water from a deep spring.

The spring water has passed through the soil, the sand, and the gravel to emerge at a lower level, filtered and oxidized,

but carrying mineral constituents from the materials with which it has come in contact. In its best estate it is the most satisfactory water in nature, colorless, cold, and organically pure. And no springs are purer than those from the hills of New Hampshire and Vermont.

The surface water varies with source and environment, but carries the washings and drainage of the surface over which it runs, is usually perceptibly colored, and is an unsatisfactory, though necessarily common, source of supply. The large city supplies are guarded only by constant vigilance and continuous observation. Each of the six supplies from the Thames to London is examined and reported upon daily.

IMPORTANCE OF THE SUBJECT.

Now mankind, with a few exceptions, drink water. It is the one common condition with reference to externals except breathing air. The uninstructed naturally drink the nearest water that is tolerable. The well informed must drink, if not supplied with good water, the best to be had. Even the simple and usually efficient precaution of boiling the water for a few minutes is irksome and most of the few who know the risk prefer to take it. But water is a pregnant source of disease, both specific and general. Two of the most fatal diseases of humanity, Asiatic cholera and typhoid fever, are disseminated chiefly, if not exclusively, through drinking water. From its nests on the Ganges, from the sacred well at Mecca, where the pilgrims wash in the water and drink the washings which return to the well, the comma bacillus starts on its deadly travels. The German Health Commission reported the cholera epidemic at Hamburg as directly traced to an inconceivably filthy history and condition of the waters of the Elbe, including specific infection.

Much nearer home is the typhoid fever, whose propagation is well illustrated by a few famous cases; such as the milk route at Springfield, the high Chicago death rate before opening the four mile intake, immediately lowered after; the Lowell and Lawrence epidemics of 1890; the St. Johnsbury epidemic more recently when the drinking water of the village came in part from the Passumpsic river below a region infected with typhoid; and the deadly epidemic at Windsor this spring.

Among the interesting facts obtained from the study of the Lowell and Lawrence epidemic, it was shown that a bacillus might reach Lawrence in eight hours from Lowell, that it might survive twenty-four days in Lawrence water, that a run of six hundred and seventy-five miles at the rate of the Merrimack would be needed to remove all bacilli from the water, that the bacilli might drop in the mud and propagate there, and best of all that proper filtration could remove all bacilli from the water.

More often, however, than by infecting with specific disease, bad water acts to pre-dispose to disease by reducing the power of resistance.

HISTORICAL OUTLINE OF THE SUBJECT.

With a partial and increasing appreciation of these conditions, sanitarians have devoted much study to drinking water. Without attempting to bring together any continuous historical account, it may be stated that important literature upon the subject begins about 1850, has a marked impulse about 1868, and that the last decade has borne an indigestibly rich literature of experimental data and conclusions.

The home of chemical methods is in England, of bacteriological in Germany, and it has seemed to be for the sanitarians of America to make the most fruitful, rational, and serviceable applications and modifications. In England the eruptive warfare between Wauklyn and Frankland has stood seriously in the way of unity and sound progress.

In the United States the wonderfully enlightened policy of the Commonwealth of Massachusetts in maintaining a corps of the ablest workers to be had, untrammeled by politics, in a long series of systematic researches has been a source of rich knowledge to the world, and nothing can be said upon either water or sewage without constant reference to the Massachusetts work.

CAUSES OF CONFUSION.

Throughout this working period even to the present time two general causes of uncertainty and confusion have prevailed : First, a difference in methods and countless variations in practi-

cing the same method, and second, an uncertainty of interpretation due to the fact that the chemical, microscopical, and generally the bacteriological methods furnish only circumstantial evidence. Fuller reference will be made to both these points ; but upon the second, the interpretation, it may be said as essential that the thing which does, or causes, harm in water, rarely, exceptionally, almost accidentally is revealed. Failure to discover the bacillus of typhoid does not clear the water of suspicion of the gravest kind if typhoidal dejecta have passed the water. Nor will any amount of chlorin and ammonia convict a water of sewage pollution if it cannot possibly have met with sewage in its earthly career. Nor can it be said with any certainty from the albuminoid ammonia in the brown peaty waters that the water will in any way affect the health of the consumer.

ABSOLUTE STANDARDS NEARLY IMPOSSIBLE.

Almost inevitable but as hopeless as the search for the philosopher's stone, has been the effort to establish criteria of circumstantial evidence upon which all waters may stand or fall. Alone, unenforced by comparisons or by positive evidence, the organic nitrogen and carbon ratios of Frankland, the albumenoid ammonia of Wanklyn, the fifty colonies of bacteria of Koch, the consumed oxygen of Tidy, excess of chlorids, presence of nitrites, butyric fermentation, all fail in critical cases. Either unpolluted waters are condemned or polluted waters are endorsed. It is as if legislative enactment or judicial decision were to define the evidence which should in all cases convict of murder a man who was not seen to do the deed. Out of this desire for analytical positiveness has grown a tendency to shut the eyes to the most convincing and valuable of all evidence—the sight of the sewage flowing into the water, and to speak evil of a water that can prove an alibi.

This should not be misunderstood. The comparative condition of the same water can well be traced from day to day or month to month ; a good or a bad water generally discloses its character to analysis ; but when it comes to a positive opinion on a single sample all criteria may fail.

PURPOSES OF WATER ANALYSIS.

The various modes of water analysis have certain distinct and definite ends in view. The limits of this paper will not permit a careful tracing of the lines of evidence in each direction; but for one purpose one kind of evidence is valuable, while for other purposes it may be worthless.

In brief summary it may be said that water is examined (1) to pronounce on its general fitness for drinking supply (infection with specific disease being excluded). (2) To establish fitness or unfitness for various industrial uses, like brewing, paper-making, steam-making. (3) To study scientifically its history through considerable periods, including the efficiency of processes of purification. (4) To pronounce upon the sanitary condition of a water otherwise good, including its certainty to cause either general or specific disease.

For the first three lines of investigation—general fitness for domestic and industrial uses and history—the processes in use, though not perfect, are fairly satisfactory. To answer pointedly the very important question, Will this water to-day cause typhoid fever or diarrhœa or any other ailment? no one is able upon any single examination, or any number of chemical analyses. Repeated biological examinations, by competent hands, will often but not always afford an answer.

METHODS OF INVESTIGATION.

The methods of investigation may be grouped into five divisions:

1. A study of the environment.
2. Microscopic examination of the sediment.
3. Bacteriological examination.
4. Physiological tests.
5. Chemical analyses.

ENVIRONMENT.

The first method—the study of environment—is sadly unappreciated, but is in many cases the simple, efficient, incontrovertible, common-sense method. If you are doubtful whether your cesspool drains into your well the chemist may

help you find out, but if you know it does what more is to be said? With typhoid at Windsor who wants to drink the water of the Connecticut at Bellows Falls, though one hundred analyses show no peculiarity in the water?

It is a serious matter to condemn a water supply, but it is often more serious not to condemn it. Suppose,—and this is merely a supposition since the facts seem to be in question,—but suppose that there was a case of typhoid on the water-shed of the Windsor reservoir, from which the dejecta ran to the basin, then the youngest neophyte in medicine might stand with all the authority and sternness of a Hebrew prophet and say, "Thou shalt not drink this water," and a convocation of all the chemists and biologists in Christendom could not contravene his position, at the time. By inspection, too, are established normal, unpolluted waters which furnish an essential standard of comparison in the examination by any other method.

MICROSCOPIC EXAMINATION OF SEDIMENT.

The organisms not bacteria have long been studied in drinking water. McDonald's classic work appeared in 1875.

The most prefect method at present is probably the Sedgwick-Rafter method, in which the organisms are collected by filtering a considerable portion of water (500 c. c.) through chemically clean sand and are afterward washed out with distilled water; enough of this distilled water to represent 100 c. c. of the original sample is put on a cell slide divided into 1,000 parts; the animal, vegetable, and amorphous residue is counted and identified in from twenty to fifty of these divisions. As illustrative of the imperfection of the previous (and perhaps of the present) methods, it appears that this method gives from two to four times as many organisms as the method it displaced, and the displaced method gave several times as many as the one which it had superseded. A great deal of work has been, and is being, prosecuted in this direction but I am not able to generalize the results.

BACTERIOLOGICAL METHOD.

The bacteriological method takes 1 c. c. or less of the water in the freshest condition possible, incorporates it with culture

media, places it in a condition favorable to growth and counts or in some cases especially cultivates the colonies which develop, the assumption having been that each bacterium in the original specimen develops a colony in the culture. For a time fifty colonies per cubic centimeter was considered the limit of approval.

It is true that some of the purest natural waters are nearly sterile and that sewage may exhibit millions of germs in a centimeter; but it is now generally recognized that this method has almost no value in a single examination. The most deadly germs are discovered only exceptionally; no one culture can be obtained for all the germs; the method of counting does not distinguish between pathogenic and non-pathogenic germs; the water is often better because of the germs, it is likely that germs developing below the temperature of the body have little or no effect upon it; and then the germs multiply enormously in the same sample in a very short time.

This method has its main value when repeated upon the same water under similar conditions, and is especially useful in determining the efficiency of filters and other purification processes.

THE PHYSIOLOGICAL METHOD.

The physiological method is an approximation to the root of the matter. The fundamental question about a drinking water is not how many bacteria or how much nitrogen it contains, but what is to be its sanitary effect; and physiological tests aim to answer that question. Physiological tests upon rabbits had oddly perverse results in the hands of Professors Martin and Hartwell during Mallet's investigations in 1881. Out of the thirty-eight waters reasonably believed to be infected and pernicious from their history, not one was reported dangerous from its effect upon the rabbits, while on the other hand water containing infusion of leaves affected the rabbits badly.

Vaughan, in an elaborate paper published in the *American Journal of the Medical Sciences* in 1892, details what is probably the most careful and hopeful of the physiological methods. He makes gelatine cultures for counting and study, and beef tea cultures for inoculation. The beef tea cultures are kept in an

incubator at 38°, the temperature of the body. After about twenty-four hours white rats are inoculated in the abdomen from these cultures. If the animals die plate cultures are made from their spleen, livers, and kidneys for study.

His conclusions are (1) that germs not growing at the temperature of the body are not capable of producing disease. "It matters not," he says, "how rich a given sample of water may be in these germs, if it contains no others it cannot be said that the water is a source of typhoid fever. The freedom from typhoid fever of communities using such waters seems to justify this conclusion. Such a water may not be, and certainly often is not, a desirable drinking water. It may be turbid with suspended matter, unpleasant to the taste, and give off a disgusting odor, but there is no evidence that it can cause disease." (2) Of the germs which grow at 38° C. or at a higher temperatures some are fatal to animals when injected sub-cutaneously, while others are not. This renders possible a division of them into toxicogenic and non-toxicogenic. (3) There is no proof that the non-toxicogenic germs can multiply in the animal body. This does not furnish proof that they might not develop in the body of man. Waters containing these have not been positively condemned, but in some cases it has been advised that their use should be discontinued. (4) Waters containing the toxicogenic germs have always been condemned.

Dr. Vaughan had studied thirty-one water germs; of these seven grow well above 38°, two or three others feebly. Four are toxicogenic. He has tried these by six methods of culture, all of the seven developing above 38°, and three others grow in "Parietti's Solution."

This method, however, and any method depending on the evidence of a single sample must often be indecisive in its negative results, because of the impossibility of knowing whether or not the sample represents the conditions of constant use of the water.

CHEMICAL METHODS.

The methods of chemical analysis have had, and at the present continue to have, greatly predominating influence in pronouncing upon the character of water.

There is growing and reasonable distrust of these methods exclusively applied. This is based upon the admitted insufficiency of the methods for all cases, the variety of results in various hands and the notorious mistakes in interpretation. These chemical methods do yield, however, valuable results, ample in some cases, suggestive or presumptive in others, and, when obtained in a rational series, historical and comparative. They do not touch the question of specific disease.

New Hampshire, Vermont, and Maine can not be said to have a definite system or policy in water work. Massachusetts has carefully studied methods, which Connecticut is closely following, so as a working system I will, in a general way, notice the Massachusetts methods, though of course not attempting accurate description of manipulative details.

The water analyst obtains his information from sources both physical and chemical, and reports under conventional and pretty well known headings.

The amount of *suspended matter* (which gives turbidity to the water) is determined by the difference of solids on evaporation before and after standing twelve hours. Suspended solids are usually easily removed by subsidence or filtration and do not play a very important part in water analysis. Though they were important at the time when one could get a dozen live minnows from a pail of Chicago water taken directly from the faucet, and minute particles of mica have produced serious irritation of the bowels.

Results are generally described in parts per million (which is milligrammes per litre) ; though in Massachusetts parts per 100,000 has long been the record.

Color is a mixture of blue and brown and is generally dependent upon the extractive organic matter from plants and leaves mixed with the color of pure water. There are several arbitrary standards. In England two wedges, one blue, the other brown, are slid one over the other till the color of the sample is matched. The wedges are divided into 40 parts, and 20 : 30 would mean division 20 of the brown over division 30 of the blue matches the water. The color of nesslerized ammonia is also used. Another arbitrary and seemingly very useful scale has been established by Mr. Allen Hazen by the

admixture of a platinum and a cobalt salt. With a recognized and accurate standard any analyst can match the color of any water, and daily or periodical changes are matters of record. The chief objection to color is its unsightliness. In some of the most highly colored peaty waters it has been found that there was very little tendency to decomposition. Surface waters in this region are nearly always colored. With reference to colored waters stored in reservoirs the Massachusetts conclusion is that the color of waters exposed to the sun in open reservoirs is reduced by storage, but it must be stored for several months to cause any material reduction of color, and from six months to one year to remove all of it.

The *odor* of a water, like its color, is most satisfactory in its absence. We, at Hanover, have had a marked instance in the evolution of sulphuretted hydrogen from the new reservoir. Sewage imparts a characteristic odor which can be detected by expert noses, in extreme dilution. The method is merely by smelling the water after it has been warmed in a covered beaker or flask.

The *total solids* or *residue on evaporation* is obtained by evaporating to dryness a measured quantity of the water and weighing. This constitutes an important factor in judging of waters for general use and in following the changes in water, but within the limits of service has little or no bearing on the sanitary character of the water. Most of the spring waters of this region have from thirty to fifty parts of solids per million, and the surface waters rather more than the upper limit. The normal surface waters of Massachusetts vary from forty in the eastern to sixty in the western part on an average. It would rather surprise a New Hampshire community to use the good water of English standards. "A water," says Fox, "should not possess more than [400 or 600 parts per million] of solids." It is customary to submit these solids to a red heat in a platinum dish and observe *phenomena and loss on ignition.* Organic matter blackens and burns. On the whole, however, this process has little value and is discarded entirely in some laboratories, while in others it is done only with certain classes of waters and under carefully prescribed conditions. Mineral

salts lose their water of crystalization during this process and some are decomposed besides.

The *hardness* of a water is the quantity of salts of lime or magnesium it holds in solution. These make the water literally hard, so that its sound when shaken in a closed bottle is distinctly different from that given by a soft water. The hard water uses up soap to form insoluble soaps of lime and magnesia before it will make a lather, and its hardness is commonly measured by the quantity of soap solution of definite strength which it uses up. Very hard waters are disagreeable to the body, expensive to the laundry, and rapidly encrusting in steam boilers, while soft waters are more corrosive to iron and more likely to carry lead from lead pipes. In England a careful comparison of the health of towns using very hard and very soft waters has been made, with the conclusion that if equally free from deleterious organic substances, hard and soft waters are equally wholesome. The Hanover aqueduct water has a hardness of 27.2 and the new reservoir of 19.2. The water furnished to London from the Thames varies from 230 to 450.

The *oxygen consuming power* is an important general consideration. It is commonly estimated by permanganate of potassium, a brilliant purple substance which readily parts with oxygen and loses color. Its evidence is general rather than special. A water using up oxygen in considerable amount is likely to be a water containing matter capable of putrefaction. Of any single substance the most important is *chlorin* in water as a constituent of common salt, for the reason that salt is an invariable accompaniment of human excreta and of sewage. It is not the chlorin that is important, it is the source of the chlorin. It is the excess of the chlorin over that normally in the water of the same region. In this direction a remarkable work has been accomplished in Massachusetts. From a study of normal, unpolluted waters the whole state has been mapped out in iso-chlor lines. The least chlorin in a normal water is at North Adams, .6 per million, the most at Nantucket, 21.6. They announce the law that the excess of chlorin is in direct proportion to the population on the drainage area. Four families or twenty persons add .1 to the normal chlorin.

There is a group of compounds all containing nitrogen to

which also special significance attaches. They are called *free ammonia*, *albumenoid ammonia*, or *ammonia by permanganate*, *nitrites*, *nitrates*.

When organic matter of animal origin begins to decompose, one of the earliest products is ammonia; this is to some extent taken up by plants and turns up later as a product of their decomposition in compounds which by the action of certain reagents give off ammonia; this kind of ammonia is called albumenoid ammonia. Much of the free ammonia, however, is in the presence of bacteria oxidized to nitrous acid (whose salts are nitrites) and finally and stably to nitric acid (whose salts are nitrates). It will be seen then that free ammonia is to a certain degree evidence of very recent pollution with decomposing matter, that nitrites are intermediate products of imperfect oxidation, and that nitrates are the final permanent result of complete oxidation, but could not be present unless at some time the oxidizable material had been at hand. They are food for plants and hence seldom abundant. The albumenoid ammonia points to vegetable decay.

On account of the history of these substances thus briefly sketched, all harmless in themselves, much stress is laid upon their quantity, especially if it can be traced from day to day in the same water. They are like the sign board which says "look out for the engine when the bell rings or whistle sounds."

The item in the chemist's report *nitrogen as free ammonia* is obtained by distilling the water and collecting the distillate in graduated jars, to these jars is added the Nessler reagent (so the process is called Nesslerizing) which gives a brown color with minute traces of ammonia; this color is matched by adding to ammonia free distilled water, known quantities of ammonia, and the difference between .002 and .001 per million is readily detected by the practised eye. Free ammonia is present with rare exceptions in all natural waters, in minute quantity and means, or suggests, according to its degree decomposition of recent nature. Though called "free" it is seldom really free but is combined with carbonic or some other acid.

The *albumenoid ammonia* does not exist in the water as ammonia, but is made into ammonia by the reagents used. It may be of harmless vegetable, or undecomposing animal origin;

still it is not water and is not wanted in the water. Subjected to the action of a strong solution of permanganate of potassium in caustic potash the nitrogen compounds break up and produce ammonia which is distilled off and determined by the Nessler reagent like free ammonia.

The *nitrites* in the water are salts of metals with nitrous acid, the partially oxidized and unstable compound. On account of its transitory nature it is always when found taken as evidence of an unsatisfactory condition. Free ammonia, chlorin, and nitrites point straight to sewage. The nitrites are determined by a beautiful color reaction, the sample being matched by distilled water containing known and very minute quantities.

The *nitrates* represent salts of nitric acid, the more stable completely oxidized compound. Frankland has urged the nitrates as evidence of "previous sewage pollution." This view is commonly accepted but not as affecting the water unfavorably any more than a scar suggests future danger. They are historical. They are valuable evidence in the daily or comparative study of water in showing what has become of the ammonia. Several quite technical methods are employed for their determination.

DIVERSITIES OF METHOD.

The distillation of ammonia will furnish an illustration of the endless variation of method even in carrying out a familiar standard process. A definite quantity of water is put into a retort and the ammonia and albumenoid ammonia are distilled off in a cleanly manner, and the distillates treated with the Nessler reagent. The color is matched by a known quantity in the same volume of distilled water. Thus the quantity is determined. If this conveys a definite idea to the unchemical mind, the process doubtless seems so simple that a well instructed child could carry it out satisfactorily. As a matter of fact until one decides just how he will do it no matter who rises as contrary authority, the whole process is as blurred to his mental vision as a revolving wheel.

Cleanliness means the absolute, tested, and proved freedom from ammonia of reagents, apparatus, hands, and rooms; the

quantity of water used may be from 100 to 500 c. c.; carbonate of soda may or may not be added in the distillation; the condensing tube may be glass or block tin; cork, or rubber, or glass stoppers may be used; the receivers should be of one or another definite size and shape according to the manipulator; the rate of distillation is an open question; the number of distillates for free ammonia may be three, four, or until no more comes; the permanganate may be added to the residue of the liquid in the retort or to a fresh quantity from the same sample; the distillates may be Nesslerized at once or the next day; the Nessler reagent and the ammonia for comparison may be made up in one way or another; the report may be in nitrogen or in ammonia; in parts per million or per hundred thousand.

The report of oxygen consumed by a water is absolutely without meaning or value unless the exact method is known. It may have been done in twenty minutes, one, six, or twenty-four hours, and by several different methods.

From these variations and many more, the results of different chemists, equally careful and accurate, do not compare at all well; while there is no place at all for the slovenly and inaccurate. On the other hand, any variation maintained uniformly and carried out accurately gives great comparative value to a series of analyses in the same laboratory. For instance, the Massachusetts board of health constantly distils three 50 c. c. jars for ammonia on the ground that they have worked out the adequacy of that procedure; Leffman & Beam recommend four, and the committee on water analysis of the A. A. A. S. recommend distillation till no more ammonia comes by actual test. The Massachusetts Board of Health continues to record its thousands of results in parts per hundred thousand while the general advice and practice is in parts per million. But the Massachusetts Board of Health has accumulated more valuable data on the subject than all the rest of the country put together.

ATTEMPTS TO UNIFY THE METHODS.

The prevailing confusion is by no means unrecognized or undeplored. In 1881, the national board of health undertook an elaborate examination of methods through J. W. Mallet and an able corps of assistants. Their report covers one hundred

and sixty finely printed pages in the Board of Health Report for 1882. It consists of an examination of processes by using waters of known character. Very little has seemed to come of it, perhaps because it was an abstract investigation in which chemists most experienced in water work were not concerned. Among the negative results of this report was the endorsement of the Frankland process, but when seven years later a committee of the A. A. A. S. investigated over the same ground, it appeared so far as the scanty replies to their circulars showed anything, that no one used this process. The biological work upon rabbits was unsatisfactory as already mentioned; it appeared also that water containing fæces gave chemical results which might be attributed to vegetable matter in solution.

The general conclusions were :—

1. That wholesomeness cannot be decided by chemical processes.

2. That these are secondary to source and history.

3. Gross pollution and departure from normal condition can be decided by chemical processes.

4. Local standards may be established.

6. Special value should be given to nitrites and nitrates, and many special recommendations were made upon the various processes tested.

In 1888, a series of questions were sent out to all well known water chemists in the country by a committee of the A. A. A. S. The questions were also sent separately to subscribers to the *Journal of Analytical Chemistry*. Just seven replies were received. On the basis of these and their own views, the committee made a report. But after all, if the exact methods of Mallet, the exact methods of the A. A. A. S. committee, the exact methods of the Massachusetts board of health, and the exact methods of Leffman & Beam were followed, the analyses would not compare well.

POSITION OF AN INDEPENDENT CHEMIST NOT HAPPY.

The present position of a chemist not having the authority and resources of a commonwealth or large city at call, is not felicitous when asked to report upon a sample of water.

Unless he has sent his own demijohn and has had the sample taken by trusty hands, there is no certainty that the sample even decently represents the water. This difficulty is complicated by sending to another chemist a sample without considering it at all important to take the samples under similar conditions or to make sure that the dirt or vinegar or molasses left in one jug is equal to that left in the other. Even if the sample is correct, there is an uncertainty in comparison, for the reason that exact agreement can come only from exactly similar methods with the same reagents and the same samples. If one chemist gets his residue of ignition by adding carbonate of soda and igniting with a radiator, while the other conceives the residue to be that actually obtained without adding anything and igniting over a naked flame, the results will seriously differ though each may be correct according to the method.

Having obtained his results he can not interpret them with any certainty except in the case of some very good and some very bad waters. The results are data in a comparison, but in a single case he has nothing with which to compare. There is one standard for the Connecticut at Hanover and another for it below Hartford, Connecticut.

The uncertainty is increased by the hankering after *blind* justice which possesses many people so that they sedulously conceal every item of information as to source and environment of the water. Typhoid fever was raging on the line of the Windsor, Vt., water supply, and only on that line. As if that fact in itself did not constitute a sufficient reason for letting the water alone, a sample was sent to Boston for analysis. But it was n't thought best to mention the little matter of typhoid to the chemist; they thought they would let him find out for himself. His report was very favorable to the water and was regarded by many as an impartial, and therefore trustworthy, pronunciamento. But the typhoid fever went on. Another chemist to whom the water was submitted with the facts, declined to analyze it, but pronounced it unfit for use. His view was thought to be biased!

SUGGESTIONS FOR THE MEDICAL FRATERNITY.

In reading a paper like this to physicians, who are for the public the immediate advisors and interpreters in sanitary

affairs, a few conclusions if not based upon, at least suggested by, these statements may help to a better understanding.

NO ABSOLUTE STANDARD.

First and most important, there is no absolute standard of chemical results upon which all waters stand or fall. A chemist may condemn a water for some purposes and approve it for others; he may say this water is too filthy to use; he may say from previous examination this water is far below its usual condition; or this water is much inferior to similar waters of the region; or this gives strong evidence of excessive vegetable matter; or even, of sewage pollution.

CHEMICAL METHODS DO NOT CATCH DISEASE GERMS.

He can not say this water does or does not contain the germs of disease; his methods do not touch this question. If an astronomer spends the night in his observatory and in the morning when asked his results shows a column of figures and declares, "I find no snakes in Ireland," you think him crazy, but his methods enable him as well to say this as a chemist's methods enable him to detect the germs of disease. If a chemist reports at all upon the presence or absence of morbific germs it is proper to ask him what methods he used.

BIOLOGICAL METHODS PROMISE MORE.

The biological methods go farther than the chemical and repeated examinations accomplish valuable results. But the bacteriological methods do not permit the statement from a single sample that no pathogenic germs are in the water supply nearly as much as spending the day in the woods with a gun without seeing a partridge warrants the statement that none were in the woods. The physiological method, while little used, seems to have great promise. It is worth watching.

A PERFECT SAMPLE OF EXTREME IMPORTANCE.

The methods of water analysis are very delicate and the most absolute cleanliness in the sample is essential for reliable results. Samples taken by the unskilled are seldom fair. Samples taken at different times are often very unlike.

METHODS AFFECT RESULTS.

Chemists have not the same competence in this kind of work, but even when they have, there is a reasonable margin of variation from different samples, and a considerable margin from differing methods which may be equally correct. It is important, therefore, that the chemist be requested to state his methods of work. Usually there is a distinct disadvantage in sending to different chemists ; if neither is honest or competent the results are worthless any way. The repetition of analyses in the same laboratory with the same reagents, methods and personal equation gathers value in going, while scattered results bring confusion and doubt.

TRUST THE CHEMIST, OR LET HIM ALONE.

Again, the chemist, if employed, should be trusted. The public, with a few enlightened exceptions, act on the principle that the water chemist is a mechanical appliance for accumulating data, and that the less he is informed about the matter in question, the more honest and reliable his data will be. He would perhaps have little cause to complain of this attitude, so long as it did not hamper his work and restrict his growth, if the public were content with the data, but they ask for a professional opinion in addition. That is, he is to throw away all his knowledge, and experience, and breadth of vision, and hazard his reputation on a guess ; because his data commonly do not touch the question of absolute healthfulness of the water. This case is entirely different from asking an assayer to determine the ounces of silver in a ton of ore from a sample. Here outside facts have no bearing. But in the question of a drinking water every possible source of knowledge is to be desired, and it is the plain duty of the chemist either to give no opinion, or to make it clear that his opinion does not go outside of his analytical data, which can tell him nothing about cholera, or typhoid fever, or diarrhea, or any other disease.

SYSTEMATIC STUDY OF WATER WOULD BENEFIT NEW HAMPSHIRE AND VERMONT.

The historical, comparative, systematic study of potable water is of great benefit and importance to a community even

measured directly in dollars and cents. The states of Vermont and New Hampshire, with their throngs of summer visitors, their superb water sources, their frequent epidemics of typhoid fever, would be greatly benefited by elaborate modern study, and the world would profit by the examination and history of waters so pure at their source.

IMPORTANCE OF EARLY RECOGNITION OF CERTAIN DISEASES

AND CONDITIONS OF THE EYE BY THE GENERAL PRACTITIONER, WITH SUGGESTIONS REGARDING THEIR MANAGEMENT.

BY H. D. W. CARVELLE, M. D., MANCHESTER, N. H.

The object of this paper is to offer a few suggestions to the general practitioner so that he may better determine what diseases, injuries, and conditions of the eye he should treat, and what cases to send to the opthalmologist. Until within a few years instruction in errors of refraction, and diseases of the eye, was not considered necessary by the leading medical schools, and many students are now graduated without a knowledge of the use of the ophthalmoscope, and are unable to diagnosticate the ordinary external diseases of the eye. That a more thorough knowledge of the eye is not required is injurious to the patient, the physician, and the ophthalmologist. The patient often suffers by not being sent to the specialist in time because the physician did not recognize the gravity of the case, and thereby loses his confidence; and when he is sent to the ophthalmologist, or drifts into his hands, as many of them do, it is often too late for him to be of any service.

It has been my experience that nothing redounded more to the credit of the physician when he was called upon to treat an eye case that he did not quite understand, than to frankly admit it to the patient and send him to the ophthalmologist, and on the other hand, he would incur their everlasting condemnation if he persisted in treating a case which he did not understand, or that turns out badly, or sends to the specialist when it is too late. To illustrate, I will cite the following case: Mrs. C., age

57, was attacked suddenly with severe pain in and around the right eye, and in less than twenty-four hours she was blind. When I saw her, twelve days later, she was still suffering with severe pain in the eye. There was no perception of light, the pupil was dilated, the cornea was steamy in appearance and anæsthetic, the anterior chamber was shallow, the optic nerve deeply cupped, and the eyeball hard from increased intra-ocular tension. It was a typical case of acute glaucoma. The family had suggested that a specialist be summoned, but the attending physician said "it was not necessary until the inflammation subsided," and persisted in the use of atropine, which was the worst thing he could have used, thinking it a case of iritis. The patient was hopelessly blind, and nothing could be done for her at that late day but relieve her pain, while if the disease had been recognized at once, and eserine used, or that drug failing, an iridectomy or sclerotomy had been performed, she would probably have saved her sight, and been spared much unnecessary suffering; as it was, she suffered severely, lost the sight of her eye, and the physician lost the confidence of that family, and was not employed by them afterwards. Familiarity with the use of the ophthalmoscope is an important acquisition to the general practitioner as it will enable him to recognize intra-ocular diseases, such as cataract, chorioiditis, retinitis, glaucoma, and diseases of the optic nerve, but it is not absolutely necessary as there are objective and subjective signs which will indicate the cases he should treat, and those which he should refer to the ophthalmologist.

The extensive ground which I am obliged to cover precludes the possibility of devoting more than a passing notice to any one subject in a paper of this kind, so I will call your attention only to the more important ones.

INJURIES OF THE EYE.

In wounds of the lids involving the margin, always bring the edges into perfect apposition by a suture on the conjunctival side, in the margin and through the skin on the outside, otherwise an unsightly notch will remain. Wounds of the conjunctiva should be brought together with fine sutures and in case

the sclera is lacerated, it is usually sufficient to suture the conjunctiva over it. Of course strict antisepsis should always be observed.

In penetrating wounds of the eye, and where foreign bodies have entered the eyeball, the case should be referred to the ophthalmologist on account of their liability to cause cataract, loss of sight, and sympathetic ophthalmia.

I have seen many cases that were hopelessly blind in both eyes from an injury to one, that, if they had had proper treatment, and prompt removal of the injured eye at the outset, would be in the enjoyment of good sight in one eye. The following is a case in point: Mr. G. C. W., 77 years of age, while splitting kindling wood, a splinter struck the left eye, causing immediate loss of sight. The right eye became affected in a short time, and in four months he was blind in that eye. He was treated by his family physician. When I saw him, nine months after the injury, both eyes were completely disorganized, and he was still suffering from pain in the right eye. If this man had had the injured eye promptly enucleated at the time of the injury, or before sympathetic ophthalmia settled in the other one, he would to-day have one good eye, instead of which he is hopelessly blind. In all penetrating wounds of the eye, particularly in or near the sclero-corneal junction, there is danger of sympathetic ophthalmia, and when this disease is once established the case is usually hopeless.

When called upon to treat an inflamed eye, always look for a foreign body either on the cornea, or under the lids.

Not long ago a case came to me that had been treated off and on for six months for inflammation, that had a foreign body imbedded in the cornea that had been overlooked. I also saw a farmer within a few weeks who had a piece of a husk of grass seed on the cornea for several months, who had consulted several medical gentlemen and had used various washes, but was not relieved until it was removed. The cornea, conjunctiva of the eyeball, and of the lids should be inspected through a convex lens of two and a half or three inches focus by a strong light, and by oblique illumination in every case of inflammation of the eye. By having the patient look down, the upper

lid can be everted, and the parts inspected, while by looking up the lower cul de sac can be exposed to view. Before removing foreign bodies from the cornea it is usually better to instill a few drops of a two to four per cent. solution of cocaine to deaden its sensibility. If the foreign body is on the surface, it can usually be dislodged by a cotton tipped probe, but if imbedded in the corneal tissue, a blunt needle or spud should be used, and great care should be observed not to allow the instrument to go through the cornea and cause cataract, as it is only one twenty-eighth of an inch in thickness in its centre.

DISEASES OF THE CONJUNCTIVA.

In ordinary conjunctivitis there is swelling and redness of the conjunctiva, the superficial vessels are engorged, and there is more or less mucoid secretion that collects in the inner corners of the eyes. The eyeball is not tender, the reaction of the pupil is normal, and there is no dimness of vision except momentarily when a shred of mucus passes over the cornea. The redness is more marked in the lids and shades off towards the cornea. The treatment consists in the use of mild astringents as boric acid two to four per cent , zinc sulphate one quarter of one per cent., or alum one per cent. instilled into the eyes three or four times a day. In children and rarely in adults, we have a form of conjunctivitis which is characterized by the appearance of small pustules on the conjunctiva near the margin of the cornea, there may be one or several. The usual causes are gastrointestinal disturbance, nasal catarrh and scrofula, and they are treated by regulating the diet, having the patient eat only plain, easily digested food, and avoid all sweets, pastry, nuts, etc. A tablet of rhubarb and bicarbonate of sodium, each two and a half grains after meals, is an excellent remedy to regulate the stomach and bowels. Locally have the eye bathed freely several times daily with a warm two per cent. solution of boric acid, and either dust on the pustules daily a little finely powdered calomel, but be sure that the patient is not taking the iodide of potassium, or you may apply a small piece, twice as large as a pin head, of an ointment of the yellow oxide of mercury of the strength of

one grain to one dram of vaseline into the conjunctival sac and gently rub the lid over the eye. It is the fashion among the laity and even by many physicians to call every eye that is red "pink eye," which is equivalent to saying that it is not a serious thing and does not require any attention, and I have seen many cases where the sight was permanently injured by adhesion of the iris to the anterior surface of the lens that had been pronounced "pink eye" by the family physician, and the patient had not sought the specialist until sight began to fail or the eye was painful. The term pink eye is misleading, does not mean anything, and should not be used. It is applied to cases of acute catarrhal conjunctivitis, which is characterized by redness, and swelling of the conjunctiva of the lids and eye-ball and accompanied by more or less muco-purulent secretion. Both eyes are usually attacked, the second eye from twelve to twenty-four hours after the first one. There is no pain or tenderness of the eyeball, the pupil reacts to light and shade, and vision is not disturbed. Every case of eye disease should be thoroughly examined, and a diagnosis made. If you are unable to make a diagnosis, and there are serious symptoms, the case should be sent at once to an ophthalmologist. Another common error that many physicians make is to call a simple redness of the lids associated with a feeling of gravel in the eye, granular lids, and to use harsh astringents, as strong solutions of sulphate of zinc, and the crayon of copper, when a mild astringent is all that is necessary as the case is often a slight conjunctivitis, the result of an error of refraction, or nasal catarrh.

In chronic granular conjunctivitis, the palpebral surfaces of the lids are red, rough, and thickened from the presence of sago-like bodies in the conjunctiva. The eyeball may become secondarily affected as by corneal ulceration and pannus. In the latter condition the upper half of the cornea becomes opaque, and red from the development of blood vessels in its substance. The treatment consists in using astringents, as zinc sulphate two grains to one ounce, or cuprum sulphate one grain to one ounce, two or three times a day, and applying to the palpebral surface of the lids, the crayon of alum or copper or the tannate

of glycerine ten to thirty grains to an ounce, and in some cases a two per cent. solution of nitrate of silver, applied to the lids and washed off with water after a few moments, to prevent its coming in contact with the cornea, is an excellent remedy. When pannus exists atropine should always be used to prevent iritic complications. These cases are chronic and obstinate, and one is obliged to go through the whole list of remedies often before the case is cured. Latterly compression, squeezing out the contents of the granules with specially made forceps, is practised with success in some cases.

DISEASES OF THE LACHRYMAL CANAL.

These are usually caused by an extension of inflammation from the conjunctiva, or from the nose resulting in obstruction in the duct. Occasionally the puncta become occluded, when all that is necessary is to dilate them, and the tears will find their way into the nose. When there is obstruction in the duct making a vertical slit in the punctum and passing probes of gradually increasing size once in four or five days, will usually result in a cure. When the sac is inflamed it is necessary to syringe out the canal with an Anel's syringe containing a saturated solution of boric acid or other mild astringent. If the obstruction is in the nose, it must receive appropriate treatment. Lachrymal abscess is of frequent occurrence in cases where obstruction and inflammation of sac have previously existed. If called to a case where there is pain, tenderness and swelling at the inner canthus, and obstruction previously existed, and the swelling is so great as to prevent slitting up the canaliculus into the sac, and pus exists, a free vertical incision should be made over the sac, and hot antiseptic applications made until the swelling goes down, then probes should be passed to overcome the obstruction or a fistula will result.

OPHTHALMIA NEONATORUM.

The conjunctivitis of new born children is one of the most serious diseases that you are called upon to treat, and one that causes more blindness than any other disease of the eye. This disease shows itself within a few days of the birth of the child

by more or less swelling of the lids and purulent or muco-purulent discharge. In some cases it is in a mild form, only requiring cleanliness and a mild astringent as boric acid to check it. In other cases it is so very severe that the lids swell enormously and the cornea sloughs within a few days from constriction, and interference with its nutrition. When called to see a case of this kind, do not be satisfied with trying to see the cornea, but with a pair of retractors separate the lids and get a good view of the cornea. Thorough antisepsis is absolutely necessary, cleansing the eyes with a solution of the bichloride of mercury (1-5000) every hour at least, and applying astringents to the conjunctiva of the lids according to the severity of the case. If the cornea is not implicated, brushing the palpebral conjunctiva with a one per cent. nitrate of silver solution once a day and washing it off with water is usually as strong a remedy as is necessary. In addition a one per cent. solution of alum may be dropped into the eye two or three times a day. If there is a corneal ulcer near the margin use one eighth of one per cent. solution of eserine sulphate three times a day to prevent prolapse of iris in case perforation of the cornea takes place. If the ulceration is near the centre use a quarter of one per cent. solution of atropine sulphate two or three times a day. There are some cases where the discharge is very copious and the swelling so great that stronger solutions of nitrate of silver are indicated, as from two to four per cent., but great care must be exercised not to allow it to come in contact with the cornea. The cornea should be inspected every day and complications met as they arise. I would also add that if antiseptic douches were freely used in every lying in case before and during labor, and the child's eyes carefully cleansed with bichloride of mercury (1 to 5000) we would see very few cases of purulent conjunctivitis in newly born children.

DISEASES OF THE CORNEA.

When the cornea is inflamed, it loses its tranparency. By oblique illumination and looking at the cornea from different angles, there is usually no difficulty in seeing a corneal ulcer. The eye is more or less painful and photophobia is usually a

very marked symptom. The pupil reacts to light and shade. In children phlyctenular keratitis, which consists of one or more small ulcers on the cornea, is one of the most common diseases of the eye. Photophobia is very marked, the child often burying its face in the clothing and avoiding the light until very late in the day. There is usually a papular eruption around the eyes and more or less rhinitis. Atropine and yellow oxide of mercury are usually the best local remedies for these cases. When photophobia is very marked one half of one per cent. solution of muriate of pilocarpin dropped into the eyes three times a day gives great relief. The child should have good air, exercise, the diet should be plain and nourishing, internally quinine, iron and arsenic, and in cold weather cod liver oil are the proper therapeutic measures. If rhinitis is prominent, Seiler's solution used in an atomizer produces good results. In corneal ulcer with hypopyon, pus in the anterior chamber, atropine should be used if the ulcer is central, and eserine when it is near the periphery of the cornea. Hot two per cent. solution of boric acid should be applied freely every hour and a protective bandage. Pyoktannin one part to 1,000 instilled into the eye three or four times a day clears up the pus in a marvelous manner in some cases. If the amount of pus is large, half filling the anterior chamber, paracentesis may have to be done, being careful not to wound the lens with the instrument or cataract will result. In the interstitial form of keratitis, atropine should always be used as the iris sooner or later becomes inflamed and adhesions form. Potassium iodide or some of the salts of mercury should be used as the cause is always due to congenital syphilis, and is associated with a peculiar conformation of the teeth, first described by Hutchinson. The cornea is usually of a uniform ground glass-like opacity, occasionally it becomes red from the development of blood vessels in its structure. After the inflammatory stage is passed, yellow oxide of mercury ointment assists wonderfully in clearing up the opacity.

DISEASES OF THE IRIS.

The most important disease of the iris is iritis. The more common causes are syphilis and rheumatism. It is a very serious disease, and the sight of a great many eyes is impaired and often lost because of a neglected iritis, or one that has not been recognized and treated properly. The symptoms are pain in the eye and brow, tenderness of the eyeball, photophobia, lachrymation, and dimness of vision. There is a ring of redness around the cornea which shades off towards the lids. The redness is caused by the engorgement of the deeper vessels, while in conjunctivitis, the superficial vessels are congested. The aqueous humor is cloudy, the pupil small, sluggish, or immovable, and if a mydriatic is used, it dilates irregularly as portions of the margin of the pupil have become adherent to the anterior capsule of the lens. If only one eye is attacked there will be a well marked difference in the color of the iris, it will have lost its lustre and will appear darker than its fellow. Atropine is the sheet anchor in this disease and it should be used early to prevent adhesion of the iris to the anterior surface of the lens, and a one half to one per cent. solution should be instilled into the eye often enough to keep the pupil thoroughly dilated during the whole course of the disease. A precaution that should always be observed in the use of atropine in patients over forty years of age, is to watch the tension of the eyeball for fear that glaucoma may be brought on by its use. Employ it often enough and long enough only to keep the pupil fully dilated while the inflammation of the iris lasts. Hot applications are very grateful to the eye and may be used *ad libitum*. In the rheumatic form of the disease full doses of the salicylate of sodium often relieve the pain in twenty-four hours, and it should be continued as long as necessary. When syphilis is the cause, the salts of mercury are indicated and the sooner the patient is brought under the influence of the drug, the quicker will the disease be overcome. I have seen a great many cases of iritis that have been treated for conjunctivitis, and where strong astringents were used until the eye was permanently damaged by the formation of adhesions, but if the distinguishing characteristics of each disease are borne in mind, the mistake ought never to occur.

GLAUCOMA.

This is a disease, that if not recognized early, will cause blindness, in acute cases, in a few hours sometimes. The symptoms are pain in and around the eye, coming on suddenly, often accompanied by nausea. Sight becomes impaired and increases to total blindness. Preceding the attack there may be periodical blurring of sight, diminution in the range of accommodation, and tendencies to see rainbows around the light. The appearance of the eye is very characteristic, the cornea is steamy, the pupil is large and does not react to light, the anterior chamber is shallow, there is pericorneal venous injection, and fulness of the anterior scleral veins, and a dull purplish discoloration around the margin of the cornea. All these conditions are caused by an increase in the intraocular fluids, rendering the eyeball harder than normal. This can be easily determined by having the patient look down, and with the tip of the middle finger of each hand on the eyeball press gently, first with one finger then with the other, and any variation from the normal resistance can be perceived. If one eye is healthy the tension of the diseased eye can be compared with it, if not you can compare it with your own. After a little experience it is an easy matter to discover an increase or decrease in the intraocular tension. With the ophthalmoscope cupping, excavation of the optic nerve will be seen, the central artery of the retina may be pulsating, and the retinal veins are enlarged and tortuous. The treatment is eserine sulphate one half grain, cocaine hydrochlorate five grains to water one ounce to be instilled into the eye every hour or two until the eyeball becomes softer, pain is relieved and vision improved. If there is no improvement in twenty-four hours, iridectomy or sclerotomy should be performed without delay. Glaucoma, as well as iritis, is often mistaken for neuralgia by the general practitioner, and in too many cases the patient is hopelessly blind before they discover their error. If you will only bear in mind that neuralgia is not accompanied by any disturbance of vision or inflammation of the eye, while in glaucoma and iritis there are marked characteristic symptoms peculiar to each disease. They both have pain in and around the eye, but in iritis it is more in the brow,

while in glaucoma, the pain may be more severe on the side of the nose, or in the temples. The pupil in glaucoma is large, while in iritis it is small and immovable. In iritis the eyeball is tender, and the tension is usually normal, while there is not always tenderness of the eyeball in glaucoma, but the tension is increased. In iritis the sight becomes blurred after a few days, while in acute glaucoma, vision may be lost in twenty-four hours. When called to a patient beyond middle age, who has been taken suddenly in the night with severe pain in and around the eyes, with nausea, and disturbance of vision if the pupil is dilated and immovable, the tension of the eyeball increased, you may be sure that it is glaucoma and nothing else. I lay particular stress on the diagnosis of iritis and glaucoma, because I have seen case after case, that have either lost their sight, or it was permanently impaired, because the condition was not recognized.

ERRORS OF REFRACTION.

In these days of progress and enlightenment we should not expect that patients would be dosed with all the remedies in the materia medica for headaches, when the proper adjustment of glasses is often all that is necessary to relieve them in the majority of cases, but I am constantly seeing patients that have taken every kind of a headache remedy without relief, who are made comfortable by having their refractive error corrected. It is the exception to find an optically correct eye, and under the pressure of our school system, and in the struggle for life, it is often necessary to correct even the smallest muscular and refractive errors that the patient may continue his work comfortably. I have had four cases of epilepsy in young people whose fits have been stopped by correcting their refractive errors, and they have been under observation for several years. One case had a return of the fits during a short period when her glasses were broken. I could cite hundreds of cases from my record book, if the limit of this paper did not forbid it, that would show the part that refractive errors play in the causation of headaches and other reflex disturbances such as nausea, vertigo, etc. As to the correction of refractive errors, it should be

done only by the ophthalmologist, and in young people, only after a mydriatic has been used, and not as it is often done by ignorant opticians and itinerant pedlers of spectacles. It is a very common occurrence to find people wearing concave glasses that have been fitted by an optician, when the patient requires aconvex glass, and many eyes are permanently weakened by improperly fitted glasses. Within a few months I have seen at least half a dozen women who were fitted with near-sighted glasses by a travelling quack who made a specialty of everything, and who was highly recommended by a certain clergyman in my city, where the patients were either far-sighted or had far-sighted astigmatism. This same quack operated for convergent strabismus on the child of another clergyman, and now the child has a deviation of 30° outward and sinking of the caruncle which will disfigure her for life. If a patient complains of headache, poor sight and pain in the eyes, the probability of a refractive error being the cause is now generally recognized, but if the sight is normal, and there is little or no discomfort in using the eyes for near work, and if the headaches are not frontal, an ocular defect as a possible cause does not usually receive much consideration. It is, however, a fact that a large number of patients who have good sight for distance and near, and are able to read and sew for hours without discomfort, suffer from neuralgic headaches that can be and are relieved by correction of some refractive or muscular defect. The following case will illustrate the latter class of patients: Miss D., 20 years of age, teacher, has always enjoyed good health with the exception that she has had headaches since she can remember, says " her eyes do not trouble her, and that she sees perfectly well and does not want to wear glasses, but that her physician had given her everything he could think of for her headaches without affording her any relief, and had sent her to have her eyes examined." I found that she had compound hypermetropic astigmatism and corrected it after using a mydriatic, and she wears her glasses constantly and has no more headaches. In conclusion I would advise every case of chorea, epilepsy, and habitual headaches to have their eyes examined for muscular and refractive defects, and I am satisfied that a large percentage of them would find relief.

NOTES ON THE SANITARY CONDITION OF MEXICO.

BY G. P. CONN, M. D., CONCORD, N. H.

"The use of travelling is to regulate the imagination by reality, and instead of thinking how things may be, to see them as they are."—*Dr. Johnson.*

That the reader may comprehend some of the various difficulties the hygienist has to encounter when seeking for information in a foreign land, I will quote from the writings of two of our celebrated authors whose graphic description expresses the conditions far better than I should be able to do for myself.

It matters not that the one is an artist and brings out in words the ideal language of the canvas, while the other presents the cold, hard facts of the business man. Both are true to nature, only the point of observation was different.

The artist and business man may travel together and share each other's woes and blessings, and yet the cool financial observations of the one will partake of but little of the enthusiasm of the other.

F. Hopkinson Smith, in his "White Umbrella in Mexico," says, it is "a land of white sunshine, redolent with flowers, a land of gay costumes, crumbling churches, and old convents, a land of kindly greetings, of extreme courtesy, of open, broad hospitality. It was more than enough to revel in an Italian sun, lighting up a semi-tropical land, to look up to white-capped peaks towering into the blue, to look down upon wind-swept plains encircled by ragged chains of mountains, to catch the sparkle of miniature cities, jewelled here and there in oases of olive and orange, and to realize that to-day, in its varied scenery, costumes, architecture, street life, canals crowded with flower laden boats, market plazas thronged with gayly-dressed natives, faded church interiors, and abandoned convents, Mex-

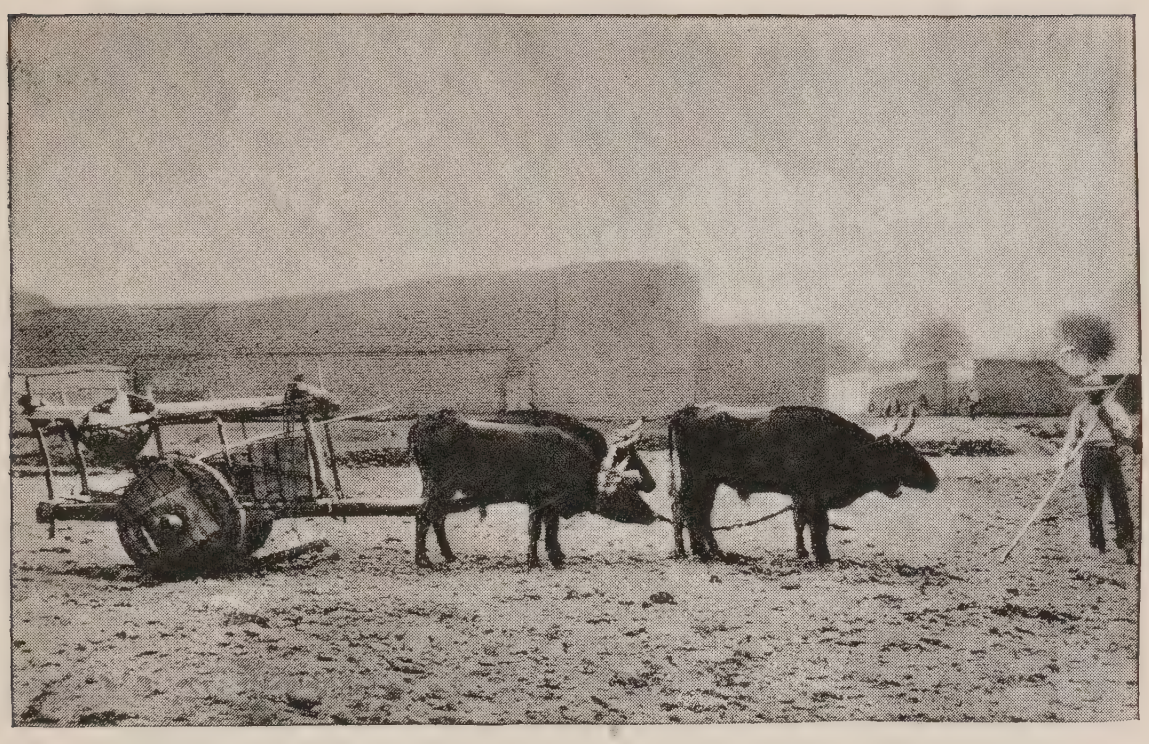
ico is the most marvellously picturesque country under the sun, a tropical Venice, a new Holy Land."

It has been said that Mexico is a land of altitudes. Her cities lie under a tropic sun, but their altitudes lift them to cooler and purer atmospheres, and make a veritable spring-time of even her summer days. The season in Mexico is all the year round; it never ends; the only difference between summer and winter is that it rains in the summer, and then only light showers.

The only information requisite, as to the weather, is: June to November, umbrellas for afternoon wear; December to May, the blue sky and the Republic of Mexico are *the only needed protection.*

William Elroy Curtis, in his "Capitals of Spanish America," says, "It wounds the pride of a Yankee tourist to discover that so little of our boasted civilization has lapped over into the borders, and that the historic halls of Montezuma are only spattered by the modern ideas which we exemplify. The native traveller still prefers his donkey to a railroad train, and carries his burden upon his back instead of using a wagon. Water is still peddled about the capital of Mexico in jars, and the native farmer uses a plough whose pattern is as old as that used in the

MEXICAN PLOUGH.



Mexican Cart.

days of Moses. Nowhere do ancient and modern customs come into such intimate contrast as in the City of Mexico. The people are highly civilized in spots. Beside the most novel and recent products of modern science one finds the rudest and crudest implements of antiquity. Types of four centuries can be seen in a single group in any of the plazas. Under the finest walls, with ceilings frescoed by Italian artists, and the walls covered with the rarest paintings, one finds a common bar-room, where native drinks are dealt out in gourds and the pinŏn stops to eat his tortillas. Women and men are seen carrying upon their heads enormous burdens through streets lighted by electricity, and stop to inquire, through telephone, where their load shall be delivered.

"In an old inquisition building, where the bones of Jews and heretics have been racked and roasted, is a medical college sustained by the government for the free education of all students whose attainments reach the standard of matriculation, and bones are now sawed asunder in the name of science instead of religion."

The Mexican cart seems to be "fearfully and wonderfully

A Mexican Market Scene.

made," and without question may be considered antique, as with the exception of a few places where mining or other labor is carried on under foreign supervision, the same old pattern is in use as was found doing business when Cortez demanded the surrender and subjugation of the Aztec capital. The creaking of its huge wooden wheels as they revolve upon their axles is suggestive of the fact that no inconsiderable amount of the power in front of the vehicle is expended in causing the revolution, and the tonnage transported must be small.

Such language represents some of the contrasts of a people inhabiting a country that was settled and conquered before the United States was known as the "land of the free." It presents an anomalous condition that must be kept in mind as we look upon the peculiarities it reflects when viewed from a hygienic stand-point. It is only when we consider this country, its people, and its peculiarities of climate that a Northern or Eastern man is enabled to satisfactorily solve in his own mind the problem of a good hygienic condition in Mexico.

While these quotations serve to give you some idea of the people and its climate, we must at the same time remember that in part it is the language of the enthusiastic artist whose imagination was lighted up by the beauty of the scenery, while the other recites cold facts from the stand-point of a commission of investigation into possible commercial relations.

From a sanitary point of view we will consider the topography of the country. The contour of the surface is peculiar, for while the greater portion of it is of a higher altitude, yet its topographical character is of such a nature that large areas have no natural drainage outlets. On the high tablelands, it is the rule rather than the exception that rivers of considerable size will empty into a lake having no visible outlet. Again, rivers of considerable size, after flowing along for miles much the same as we should expect in New England, will at once disappear by being absorbed by the earth, and will not appear again for long distances, when they will come to the surface and apparently having been reinforced by other streams, for the volume of water will be far greater than at the place where last visible.

It may here be remarked that the central portion of the Mexican republic, and comprising nearly all except that portion lying directly adjacent to the Pacific ocean or Gulf of California, on the west, and the Gulf of Mexico on the east, is higher than any part of the United States east of the Mississippi river except our highest mountains. The Mexican Central railroad, which carries one from El Paso, Texas, to the City of Mexico, 1,224 miles, has no point in its entire distance that is not more than 600 feet higher than our own Kearsarge mountain, while there are considerable distances on this line where the rails are from 1,000 to 2,000 feet higher than Mount Washington. With such high altitude, one might suppose that the drainage of the city might be easily affected. Unfortunately this is not true, and I think no city in the world has encountered more difficulty or been to greater expense, and still its drainage system is incomplete.

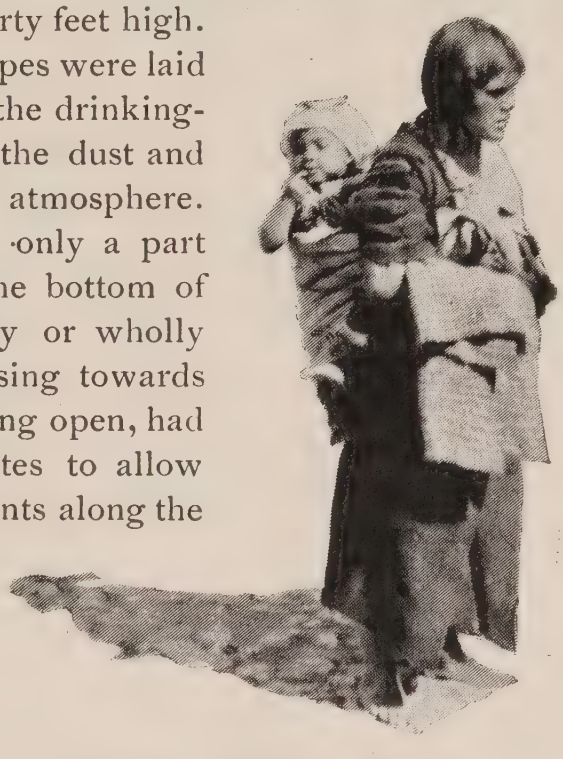
The reasons for this are mainly the topography of the country to be drained. You may observe that I speak of it as a country instead of a city, which is true, as the city is located near the centre of a plain more than forty miles in extent, and the foot hills are plains extending still farther, so that the basin is more than one hundred miles broad. This basin is completely surrounded by an unbroken chain of mountains, ranging from a few hundred to more than 10,000 feet above the level of the city; therefore, the natural water-shed of this whole section empties into this valley and its numerous lakes, some of which are actually higher than portions of the city. These are held back by dikes, like the waters in some portions of Holland, and nothing but this fact, and that the average rainfall for this basin is much less than we have in the United States east of the Mississipi, prevents its being inundated a considerable portion of the time.

Occasional inundations have taken place, and this has been a potent factor in causing its people to try to solve the problem of how the city shall be drained. The city was inundated in 1553, in 1580, in 1607, and from 1629 to 1634—five years—it remained under water. With lakes almost within the city limits that are on a higher elevation than the streets, you will expect the ground water to be higher than the surface,

and I believe it is allowed that the average for the year is less than four feet, although, until the dike was constructed around Lake Texcoco, the water came within about eighteen inches of the surface, and not infrequently found its way into the streets.

This surface water is impure, being discolored, and generally holding in solution large quantities of crude salts of soda.

The supply of water for the city comes from Chapultepec, and at this point I would add that not infrequently small mountains of porphyry seem to have been pushed up through on that plain, as well as in other parts of Mexico, undoubtedly by volcanic force, and generally good water is found somewhere in the fissures of this volcanic rock. The immense spring on Chapultepec is high enough for the water to find its way into the city by gravity, through an aqueduct constructed of stone and cement, supported on arches of the same material. There are two lines of aqueducts from this spring, which consist of open viaducts supported on arches, these arches being part of the way thirty or forty feet high. Some ten years ago iron pipes were laid in this viaduct to conduct the drinking-water and secure it from the dust and other impurities of the atmosphere. These iron pipes conduct only a part of the water, and lie in the bottom of the open viaduct partially or wholly covered by the water passing towards the city. This viaduct, being open, had to be levelled, and had gates to allow the water to be used at points along the way for irrigating purposes. These volcanic mountains are isolated, and generally not more than a mile or two in circumference at the base, and in shape somewhat resembling the pinnacle at Hooksett. The original site of the city was on a small peninsula in the midst of a lagoon of salt



CHAMULA MOTHER AND CHILD.

water, and was found to be liable to be inundated whenever there was an extra rainfall.

We are informed by historical works that the original Aztec population were intensely religious, and probably superstitious in character, and believed they were to migrate from place to place until they saw a sign which was to be to them significant of the place of their habitation. This sign was to be an eagle holding a serpent in its bill or talons, and resting upon a cactus. After nearly two centuries of migrating hither and thither through the country, much of the time fighting for their lives among their enemies, they came upon this sign, in their imagination, and founded the city on that spot. It is in latitude 19° 25′ north and longitude 99° 5′ west of Greenwich. I would add that this sign they sought for so long became the national emblem of the Republic of Mexico.

Seal of Mexico.

An island was formed in 1466 by Montezuma the First, who had a dike constructed about seven and a half miles in length and sixty-five feet in thickness to hold back the waters of the lake. This island was formed in Lake Texcoco.

In 1519, Cortez captured the city, but was obliged to vacate in about seven years.

It is hardly necessary to remark that the city in its present condition is not considered a healthy one, having a very large death rate.

In 1607, about the time of the settlement of Jamestown, a plan was considered to carry away the surplus waters so as to prevent inundation; but little or no thought was taken of making a sewer. Lake Zumpango being the highest of six lakes, the canal through the Nochistongo cut was expected to carry away the surplus water which formerly had flown into the lake in which the city was situated, but it was not considered feasible to carry this cut deep enough to drain the lower lakes of the

city. This cut, which was completed during that century, carried off the surplus water for a few weeks, when it was undermined, and caved in. Repeated attempts have been made to open it, but they have not succeeded in carrying it down to its original level.

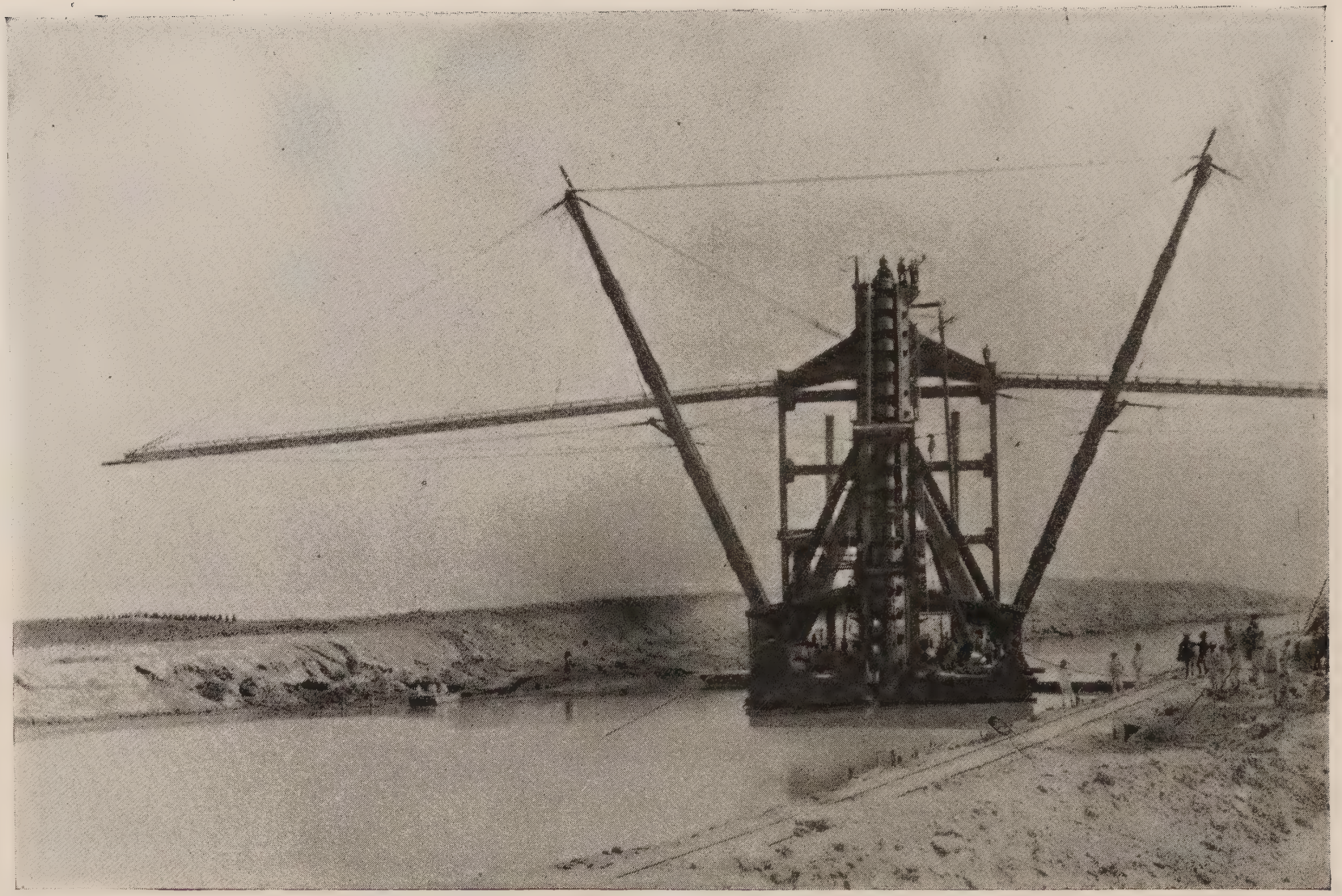
There are no fire-places, furnaces, or stoves in the city, all cooking being done in the old-fashioned Dutch oven, with a charcoal fire.

TURKEY BUZZARDS.

As a scavenger all through Mexico, the turkey-buzzard takes the first rank, as in our southern states, and the government imposes a fine on any one slaughtering them.

The Spanish moss or lichen grows on nearly all large trees, and reminds one of our southern states. The eucalyptus grows in a thriving manner wherever it is planted.

The present canal and tunnel for the drainage of the city is



DREDGER.

a modification of Enrico Martinez's Nochistongo cut, and was planned by Captain Smith, of the American Engineer corps, in 1849. The canal and tunnel when complete will be a little more than thirty miles in length, of which the tunnel represents nearly one tenth. The location of the tunnel is under what is called the "saddle in the mountain," which represents the shortest distance through from side to side. The cut was commenced in 1879, or nearly forty years after it was first proposed, at the farthest extremity, and it is a portion of the tunnel.

Political agitations have been the bane of the country, and put a stop to the work. Little more was done until 1885, when the council of the city and the federal government combined to consummate this important sanitary work. A commission was appointed, who have had charge of the work, and who have directed its execution. A loan was contracted in London for about $12,000,000, which has served to cover the cost up to the present time, and probably no trouble will be experienced in raising sufficient funds to complete the plan. A rough description of this work would be to describe it as an open ditch or canal, having a depth of from 15 to nearly 100 feet, and a width averaging 40 feet on top, with the ordinary slope of sides, capable of carrying away eighteen cubic metres per minute. The object is, first, to carry the sewerage from the city, and, second, the surplus waters which can be used to flush the canal. The latter will be very necessary, as the grade of the canal is only about one foot to the mile, being less than thirty-six feet in the whole distance. I use the words "surplus waters" for the reason that all portions of that plain are very productive when water is used for irrigating purposes, consequently it becomes necessary to obtain water at a certain depth in order not to destroy the basin or plain for agricultural pursuits. The work has been actively prosecuted since 1885, and it is hoped that it may be completed in 1894. Over 5,000 men are employed in this work, and five immense dredgers, some of them nearly as large as those used on the Panama canal. Each dredger is a complete outfit by itself, as it has its own motive power; its dynamos for electric lighting; its dormitories and dining rooms for the workmen, and with relays of men, is prepared to push the work during the whole twenty-four hours.

As will be observed in the illustration, a narrow-gauge railroad had been constructed along the side of the canal.

This was rendered necessary for the transportation of material and supplies, and over twenty miles has been built for that purpose.

Three locomotives were employed, and over the mountain all of them were required to move heavy trains.

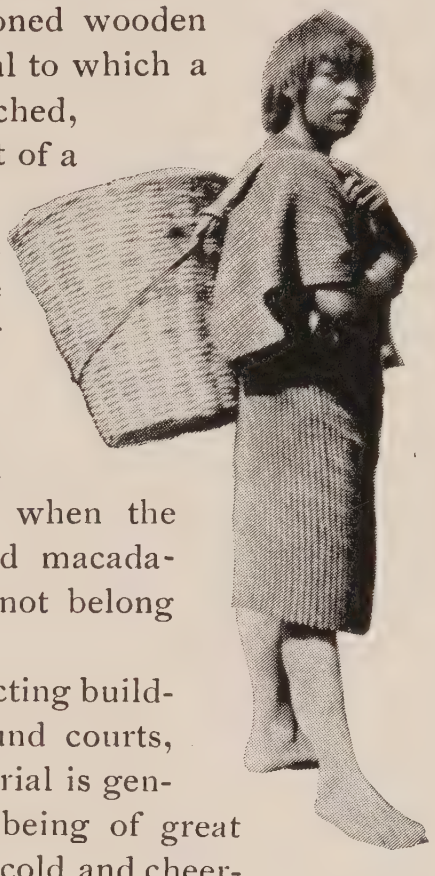
The contract has been let to an English firm by the name of Pearsons & Son, who have bound themselves to complete the canal by the month of September, 1894. These contractors are carrying out the work of the canal in two different manners,—namely, by hand-work, with centrifugal pumps to draw off the water which filters in the tunnel, and by means of the dredgers I have mentioned, which have a capacity for 3,000 cubic metres of excavation per day, and which deposit the earth and water excavated at a distance of more than 200 metres from the centre of the canal. This is accomplished by means of the buckets of the dredgers, like an elevator, carrying the earth and the water to a height of about sixty feet, where it empties into a chute, and the mud and water flow through the horizontal shafts which extend several feet beyond the sides of the canal. As the earth which has been excavated falls upon the sides of the canal, enough water falls with it, so that it becomes a solid bank, and in places where the canal passes through lakes, this earth is thrown up upon the sides, and becomes a dike to keep the water of the canal from flowing into the lakes. At the same time, flumes are constructed through this dike, where by raising a gate the surplus water and overflow of the lake can be run into the canal for the purpose of flushing.

In the construction of this canal twenty-three overhead structures are required, five of them being aqueducts to carry rivers, four are bridges for railroads, the rest being for main roads or private ways. These are all constructed of masonry, and some of them, especially just before we reach the tunnel, will be of great expense by reason of their perpendicular elevation. The tunnel commences where the depth of the canal is nearly eighty feet, and I understood the "saddle of the mountain," where the tunnel passes through, to be a little more than 300 feet

above the level of the mason work of which the tunnel is constructed.

The streets in the city of Mexico are kept fairly clean, as a large force of men are employed to sweep the streets and remove the garbage. This is utilized by being carried away for fertilizing purposes.

The watering of the streets and plazas is done by men with buckets, or the old-fashioned watering pots. Generally you would see men with an old-fashioned wooden pail with a bail of the same material to which a short piece of rope would be attached, which served to bring the water out of a ditch or cistern, when with a dexterous movement of the arms and wrists he would convert the whole pailful of water into a small shower to sprinkle the street.



CARRIER.

I only saw one street-sprinkler while in the city, and that was used on the "Paseo de la Reforma," when the street was being reconstructed and macadamized, and I question if this did not belong to the contractor.

The prevailing method of constructing buildings is and has been to build around courts, —patios,—and as the building material is generally stone or cement,—the walls being of great thickness—the rooms are frequently cold and cheerless. Very little lumber enters into the construction of buildings, even the floors being generally of stone or clay.

Scarcely any chimneys are to be seen, and no fire is used except in cooking.

The climate, as described by Hopkinson Smith in the quotation which I read, is scarcely exaggerated, but were it not that a cloudless sky is present every day in the week from October to May, it would be dismal in the extreme, for at this altitude it all depends upon sunlight, as during a single night the temperature will fall to 40° F., and sometimes even lower. There

is always great change between the temperature during the day and at night, but with this constant sunlight during every day in the winter, any one must be difficult to please who cannot enjoy its soft atmosphere.

The air is very dry, and one for a time suffers from thirst, but gradually we become accustomed to its effects, and afterwards do not mind or think much about it. This dry atmosphere, and the evaporation it occasions, is a potent factor in the sanitary condition of the city and country, as it extracts moisture from all inanimate substances very rapidly, therefore many things that if left to themselves in New England would become a decided nuisance, simply become a dried fibre or mass in Mexico that gives out no odor.

In regard to the possibilities of Mexico, it is but justice to say that progressive sanitary improvements may be found in almost every section, and it will not be long before one will find good drainage and good water in all large towns and cities, and I suspect it will not be very long before one will find the Yankee stove on duty in almost every well-regulated household, and while these improvements will take away much of the charm and novelty of travelling through this unique and strange land, it will be the means of affording much comfort to the invalid and tourist.

I have heard this country compared with the old cities of Southern Europe, Asia, and Africa, and who knows how much they are the junior of some of these places. I cannot better illustrate my meaning than to use the following quotation, which I picked up in Mexico, but am not certain of the author's name.

> "World wrongly called the New: this clime was old
> When first the Spaniard came, in search of gold.
> Age after age its shadowy wings had spread,
> And man was born, and gathered to the dead;
> Cities arose, ruled, dwindled to decay;
> Empires were formed, then darkly swept away;
> Race followed race, like cloud-shades o'er the field,
> The stranger still to strangers doomed to yield.
> The last grand line that swayed these hills and waves,
> Like Israel, wandered long 'mid wilds and caves,

Then, settling in their Canaan, cities reared,
Fair Science wooed, a milder God revered,
Till to invading Europe bowed their pride,
And pomp, art, power, with Montezuma, died."

NOTE.—The author is under obligations to the editors and publishers of *The Granite Monthly* of New Hampshire and *The Engineering Magazine* of New York for a portion of the plates used in illustrating this article.

ADDRESS

TO THE GRADUATING CLASS OF DARTMOUTH MEDICAL COLLEGE.

BY DANIEL S. ADAMS, M. D., MANCHESTER, N. H.

Mr. President, Ladies and Gentlemen, Members of the Class: It devolves upon me as senior delegate to congratulate you upon the successful ending of your college course and your entrance into the medical profession ; I should add to this the successful building of a substantial foundation for the intelligent pursuit of a medical education, for he that lays down his studies at the threshold of his medical practice forces himself to lean upon knowledge that, in these days of medical advancement, soon becomes mossgrown, is quite an unsafe support, and is not always the best he can do for his patient.

We welcome you to our ranks of toil, and we would not have you believe that you have chosen a profession of luxury and indolence, as medical practice is not in response to the sweet strains of music, nor is it always properly compensated, for the cries of pain often knock at our doors when poor tired nature is almost on the verge of despair, and unrequited labor is forced upon us, and we meet with poverty, suffering, and misery, than which death itself is far preferable.

But it is not my mission to portray to you your field of labor, for he that foreshadows oft borrows misery, so we will turn to the brighter side and consider for a few moments some points of progress and the future hopes of our chosen profession.

That the past status of medical practice has been very unsatisfactory, even to the progressive practitioner, is only too apparent to every one.

Our specifics have been too few and our symptomatic remedies and placebos altogether too numerous.

Thanks to the German school with their modern methods of investigation, borrowed from Pasteur, that are far more reliable than the microscope alone, they are slowly but surely leading us out of the darkness of the past into better light, and we hail with joy even the dawn of a scientific basis that will give us more satisfactory and more positive results.

For many years medical knowledge remained in statu quo, but that period is far in the past, and for many years after the science progressed steadily, until within the last quarter of a century its strides have been so great that much that we had learned previously had to be discarded for newer and more definite knowledge.

At the present time, its progress is simply wonderful, and he that keeps pace must have a liberal fountain of outside knowledge from which to draw, apply himself studiously to his books, and be a close observer at the bedside.

From the past and the present we peer into the future with eager interest, and often ask ourselves what is that future to be? Is it to be a definite science that will give us positive results, multiply our specifics and bury our placebos? We faithfully believe that these results are in store for us, and that ere the close of another quarter of a century they will be ours to use.

A few years ago surgery without suppuration was unexpected and rare; at the present time surgery with suppuration is faulty and often censurable.

Then erysipelas was dreaded and shunned as a plague, now we cultivate it in our offices and inject it as a remedy.

In fact the study of bacteriology, whose day is but just dawning, has already taught us that the human system is the constant feeding-ground for untold millions of micro-organisms, many of which are harmless while others are infectious.

It has also entirely revolutionized the etiology of disease and given us something tangible for its origin and propagation.

Although still clouded in darkness as to the exact cause of many diseases, yet we all believe that all contagious, infectious, and miasmatic diseases, so called, are the direct result of some ectogenous micro-organism in the system that has entered through the mucous tissue, cutaneous tissue, or glands.

Aside from the above, we have only the inflammatory dis-

eases, a few cardiac diseases, and the diseases incident to old age, if there be any that are dependent upon this period of life alone. Simple inflammation itself is a physiological reparative process, and infective inflammation is microbic, so these diseases must be brought on by some irritant back of them, which sometimes is microscopic and may always be the result of microbes or their fermentative or putrefactive alkaloids.

We are not dealing to-day with the mere guesses of the old Roman authors, Varro and Columella, who referred the origin of malarial fevers to the entrance of low organisms into the system, for want of knowledge of other causes; nor to the wild, extravagant theories of one writer of the seventeenth century, who after the discovery of infusoria and spermatozoa by Leeuwenhoek, believed that all contagious diseases were caused by some animal in the system deposited there by insects flying about in the air like a cloud of locusts, and proposed in real earnest to frighten them away, or destroy them in time of epidemic, by the blowing of trumpets, firing of cannon, and burning of bonfires: but we are dealing with known facts, the result of bacterial cultivation and inoculation, as we would cultivate wheat and sow it to see it reproduce itself.

That this method of investigation is positive there can be no doubt, although great patience, and many experiments, and often years of diligent research are required to determine the cause of a single disease.

That this method is far superior to all other methods the world has ever known cannot be questioned, for the very cultivation of the microbe brings us into close relation with him, and by the time he has passed through the various sifting processes of the different investigators and become established as the cause of some disease, we are fairly well acquainted with his life's history; we have learned whether he is a bacillus, bacterium, or micrococcus; whether he is an aerobic microbe, requiring oxygen and living in the tissues within its reach, or an anaerobic microbe not requiring oxygen and living beneath the surface beyond its reach.

We have learned whether he invades the cutaneous, mucous, adipose, glandular, circulatory, or connective tissues, or a num-

ber of them, and what particular organ he is most likely to assail.

In some instances we have learned that he has a natural enemy or phagocyte, which may be comparatively harmless to the system, and which if turned loose in the system will soon devour him and arrest or prevent the disease.

As, for instance, we have learned that the bacilli of anthrax are destroyed by the ptomaines of suppuration; that cadaverin, a non-toxic alkaloid, destroys the pyogenic microbes; that the streptococcus of erysipelas destroys epithelial cancer and cures diphtheria.

In others we have learned that the leucocyte destroys the microbe and prevents further development.

We have learned the temperature required for the development and destruction of each; most of them being destroyed if exposed a few minutes to 212° F.

Its study has unified scrofula, lupus, and tuberculosis; taught us that the tubercle bacilli may for years be localized and confined to a small area, and it has placed many heretofore obscure lesions within the range of rational and successful surgical treatment, the removal in the majority of cases proving a permanent cure. It has traced the dreaded tetanus to a definite bacillus, that is often preventable.

We have learned that oxygen in definite quantities is required to form the poisonous bases, while a less quantity, or free supply, results in non-toxic products.

Immunity from attacks of certain diseases has been secured by the repeated use of attenuated or diluted microbic cultures.

These facts are already fairly well established and generally accepted by the profession, and the day of the study of bacteriology is but just beginning to dawn.

We look forward with renewed courage and great hopes and expect the dividing line between animal and vegetable will soon be surveyed and established, although it is not essential either to the proper cultivation or destruction of the microbe.

We expect to see each microbe isolated, classified, and defined, although this is the most difficult problem in the whole study. We expect to know more of the morphology of these organisms and possibly of their destruction in this state.

When these points shall have been a little more clearly defined, we expect therapeutics to be aroused from its slumbers and pushed forward sufficiently to meet the requirements of the bacterial studies.

We are sure that at present etiology and pathology of disease are far in advance of therapeutics and materia medica, and as our knowledge advances we must look for great changes in our remedies, and for entirely new methods of treatment.

That the profession is dissatisfied with the ordinary methods, and ripe for the use of new therapeutical measures, has been well illustrated by the avidity with which they seized upon the gaseous treatment of consumption and the ozone treatment of various diseases.

Our new therapeutics must of necessity deal largely with the natural history of micro-organisms, for we can best destroy that with which we are best acquainted.

We shall expect to see the gases brought into use, not alone to be inhaled or used as enemeta, but to be used hypodermically and applied to the surfaces; for certainly many of the gases are harmless, and if we can smother an aerobic microbe that is causing serious disturbance in the system in carbonic acid gas, it may be our easiest way of destroying him.

Electricity should take a prominent part in our future treatment, especially in certain cavities, to decompose previously injected salts, to set free certain gases that in some forms of disease, or possibly in the tissues, will either destroy the microbe or prevent or nullify their poisonous ptomaines or leucomaines in their transformation of organic matter into the final products, urea, ammonia, carbonic acid gas, and water; for, as above stated, non-toxic ptomaines or leucomaines are produced in a free supply of oxygen, even if no modification of the current itself is found sufficient to do the work.

We shall also expect certain permeating oils or other medicinals will be discovered, that are poisonous to these organisms and innocuous to the system, that can be sufficiently diffused through the system to destroy many of them.

Bacterial cultures or their products will also enter into our future treatment, as certain forms readily destroy other forms; but our greatest hopes lie in the prevention of disease.

If there be a certain element or pabulum in the system upon which the contagious microbes feed to produce the mono-infectious diseases, and which if once removed from the system never again accumulates, so the disease cannot be repeated, the commonly accepted explanation, or if on the other hand, which is quite as probable in the present light of science, the microbes of contagious diseases leave some chemical substance in the system that forbids the re-entering of the same microbe, we had better by far in the one case feed out the pabulum a little at a time, or in the other accumulate the chemical guard slowly until we are in either case immune against the disease, as Pasteur has obtained almost perfect results in rabies, or hydrophobia, by injecting its ptomaine during the stage of incubation.

It may not always be necessary to use the same microbe for it is found that some of the mild, non-toxic microbes leave ptomaines that render a culture immune against an infective microbe.

But there is one peculiar and most interesting feature connected with this study. It has been common property to the profession since the days of Jenner that small-pox is modified by passing its virus through the system of certain animals, and until recently, strange as it may seem, this knowledge was confined entirely to small-pox.

Recently it has been learned that the virulence of anthrax is greatly modified by innoculating it into different species of animals, while the same claim has been made for other diseases, which is undoubtedly correct.

Then so far as we are able to obtain the modified culture or virus, the problem is solved in reference to the mono-infectious diseases.

In some of the others immunity may be procured for a time, but permanent prophylaxis may never be obtained, and we will have to meet them as best we can with our improved methods of treatment.

With these few random thoughts, a sort of a general synopsis of our reading on this subject, gathered by the wayside, but partially assorted, and hastily thrown together in the intervals of a professional life, which simply suggest to you a broad sci-

entific field, much of which is uncultivated, and in which we would be most pleased to see some of you turn the first sod; we hope to see you in the van of your profession, laboring as diligently in your practice as you have in your preparation.

Let your private life be independent and free, accounting only to your own consciences; let your professional life be all that you can make it scientifically, accounting to the various critics of the world.

When new ideas suggest themselves, as oft they will, in your profession, examine them carefully, put them to the test, and if they are not found wanting and there is value in them, publish them to the world although they may differ with every book at present in print.

The reverence with which we once held the medical knowledge of our forefathers, and the tenacity with which we clung to accepted medical ideas, were great impediments to the progress of the science, and smothered all thought of investigation.

To a great extent this was forced upon us, for to differ with these teachings and hold advance views meant to be ostracized to some extent by the profession; the bold stand of Niemeyer on pneumonia quickly followed by other radical changes and advancements by Pasteur and Koch somewhat broke our faith in the older theories, made new thought welcome to the profession, and placed these men in the front ranks. Let their example be a stimulus to you in your work.

Now joining with your teachers and friends, we cordially extend to you our best wishes for your future prosperity, believing that you will all go forth to do your whole duty as medical men.

REPORTS OF DISTRICT SOCIETIES.

REPORT OF STRAFFORD DISTRICT MEDICAL SOCIETY.

BY CHARLES A. FAIRBANKS, M. D., SECRETARY.

The eighty-fifth annual meeting of the Strafford District Medical Society was held at the American House, Dover, December 20, 1893, at eleven o' clock a. m.

Members present—Drs. L. G. Hill, C. A. Tufts, C. A. Fairbanks, G. A. Tolman, J. R. Ham, William Hale, A. Noel Smith, M. C. Lathrop, A. P. Richmond, M. B. Sullivan, Dover; J. J. Berry, A. C. Heffinger, Benjamin Cheever, John W. Parsons, Portsmouth; J. S. Roberts, Durham.

The president appointed the following committees:

On nominations—Dr. L. G. Hill, Dr. J. R. Ham, Dover; Dr. Benjamin Cheever, Portsmouth.

On assignment for topics for 1894—Dr. A. C. Heffinger, Portsmouth; Dr. A. Noel Smith, Dr. William Hale, Dover.

On necrology—Dr. C. A. Tufts, Dr. L. G. Hill, Dover; Dr. J. S. Roberts, Durham.

In the absence of Drs. J. S. Parker and C. E. Blazo as members of the council, Drs. J. R. Ham and William Hale were appointed.

Dr. L. G. Hill, for the council, recommended the following named physicians as members, and they were elected: Drs. George A. Tolman of Dover, James S. Roberts of Durham, Benjamin Cheever of Portsmouth.

Dr. Hill, for the committee on nominations, submitted the following report, which was accepted:

President.—Dr. John J. Berry, Portsmouth.

Secretary.—Dr. Charles A. Fairbanks, Dover.

Treasurer.—Dr. Charles A. Tufts, Dover.

Auditor.—Dr. A. Noel Smith, Dover.

Councillors.—Drs. John W. Parsons, Portsmouth; E. T. Hubbard, Rochester; George D. Emerson, South Berwick, Me.

Orators.—Drs. Thomas J. Ward, George A. Tolman, Dover.

Dr. Heffinger of Portsmouth, for the committee on assignment of topics for 1894, reported as follows:

Dr. Benjamin Cheever, Portsmouth, on diarrhœa.

Drs. George P. Morgan, Dover; J. C. L. Willis, Eliot, Me.; J. S. Roberts, Durham; E. T. Hubbard, Rochester, on topics of their own selections.

The president then delivered the annual address, the topic being "The present and future status of Antiseptic Surgery."

It was voted that a copy of the address of the president be referred to the New Hampshire Medical Society for publication.

A case of acute appendicitis was reported by Dr. M. C. Lathrop, and was discussed by Drs. Ham, Berry, Heffinger, and Hill.

The society adjourned at 2 o'clock for dinner at the American House. At 3 o'clock the members again were called together, and discussion was had of various medical subjects.

The session for the year was adjourned at 5 o'clock.

REPORT OF CHESHIRE COUNTY MEDICAL SOCIETY.

BY S. M. DINSMOOR, M. D., SECRETARY.

The Society has held three meetings during the year, all of which were held at City Hotel, Keene.

At the annual meeting in October the following officers were elected for one year:

President.—Dr. F. H. Burnett, Hinsdale.

Vice-President.—Dr. George I. Cutler, West Swanzey.

Secretary and Treasurer.—Dr. S. M. Dinsmoor, Keene.

Dr. Thurston of Keene presented a paper on the treatment of "Acute Pneumonia," in which he detailed at length his methods of procedure, and results attained.

Dr. Loveland of Gilsum read a carefully prepared paper on "The Medico-Legal Relations of the Doctor."

Dr. Burnett of Hinsdale presented a paper on "A review of the treatment of Epilepsy." All of the papers were followed by a general discussion.

The retiring president, Dr. Gleason, presented his address on "The present condition and needs of our Society."

FEBRUARY 6, 1894. At the winter meeting, the first paper presented was by Dr. G. C. Hill of Keene on "Hæmaturia."

Dr. H. K. Faulkner of Keene presented a paper on "Intestinal Obstruction." Discussion followed both of the papers by all the members present.

Reports of a number of cases of interest were given, both medical and surgical.

Dr. Elizabeth B. Reed was admitted to membership by a unanimous vote.

MAY 8, 1894. Dr. I. J. Prouty of Keene occupied the time for nearly an hour, in giving an extended account of his recent trip to Europe, in which he gave in detail his experiences in European hospitals, methods of surgeons there, and reported a large number of operations which he witnessed. He expressed the opinion that our own country afforded as great opportunities to the medical man as any to be found in Europe.

Dr. Reed of Keene presented an interesting paper on "Infant Feeding," which was discussed at length by several members.

The remainder of the session was taken up in reports and discussion of cases in general practice.

Dr. H. L. Waterman of Fitzwilliam was admitted to membership.

The meetings of the year have been fairly attended, and will compare favorably with those of previous years.

REPORTS OF DELEGATES.

REPORTS OF DELEGATES TO RHODE ISLAND MEDICAL SOCIETY.

BY CHARLES A. MORSE, M. D.

Your delegates met at Tillinghast's assembly rooms and were introduced to Dr. William R. White, the recording secretary, who in turn introduced us to Dr. Robert F. Noyes, the president of the society. After the usual formalities were ended delegates from Maine, New Hampshire, Massachusetts, Connecticut, and New Jersey were presented to the meeting and all made brief speeches. Dr. George D. Hersey then read a very able paper upon "The Selection and Administration of Anaesthetics."

At 12 o'olock m., Robert F. Noyes, M. D., president, delivered the annual address upon the "Evolution of Antisepsis." The address was one of the ablest productions to which we ever had the pleasure of listening.

Adjournment followed the president's address.

The annual dinner was held in the Trocadero which was a feast fit for a king. Dr. William R. Burge, as anniversary chairman, presided with his accustomed dignity and brightness. The speeches of President Noyes and Dr. Mary Putnam should have been heard to have been appreciated. Your delegates being obliged to take a train were deprived of the pleasure of hearing the other speeches, which were undoubtedly brilliant and to the point. For the many courtesies shown the representatives of this Society we, the delegates, are under lasting obligations.

REPORT OF DELEGATE TO THE DISTRICT OF COLUMBIA MEDICAL SOCIETY.

BY M. W. RUSSELL, M. D., OF CONCORD.

The Medical Society of the District of Columbia was organized February 16, 1819. It was decided to commemorate the seventy-fifth anniversary by a meeting and appropriate exercises. Each of the eleven medical societies in the United States older than this Society was invited to send a delegate to the meeting. I received the credentials of our Society, and arrived in Washington on February 15. That evening Dr. Samuel C. Busey received the visiting delegates, invited guests and members of the Society at his spacious residence. Everything possible was done by the host and members of the Society for the pleasure of the visitors, and a delightful evening was spent.

Friday evening the anniversary meeting was held in the Armory Hall of the National Rifles on G street, which was largely attended by members of the profession and residents of Washington.

Dr. Busey, president of the society, delivered an able address full of interesting reminiscences and valuable historical matter. No epitome can do it justice. It was the production of a mind expanded by study and large experience. Dr. Busey has been a member of the Society for over three fourths of the period of its existence, and he loves the profession that he chose and the work which it demands with all the fervor which characterized his earlier years.

Theophilus Parvin, representative of the College of Physicians of Philadelphia, delivered an address of congratulation. It is needless to say that the address was eloquent and scholarly. He paid glowing tribute to the work the Society has accomplished, and his references to some of the older living members were most happy and fitting.

Dr. William N. Johnson gave in an able paper the history of

the Society from its organization, and short biographical sketches of several of its most prominent members.

Ford Thompson spoke of the hospitals of the District of Columbia in a well written and intensely interesting paper.

Thomas C. Smith recited the history of the several medical colleges of the district, giving to each one its full meed of praise.

Every paper was an able one and showed much careful thought and study.

After the meeting a magnificent banquet was served at the Arlington. The post-prandial speeches were able and witty, and kept the audience in a roar of laughter.

Since my return I have received the following resolution adopted by the Society of the District of Columbia:

MEDICAL SOCIETY OF THE DISTRICT OF COLUMBIA.

WASHINGTON, D. C., March 10, 1894.

DEAR SIR:

We have the honor of transmitting the following preamble and resolution adopted by the Medical Society, with the request that they be presented to the New Hampshire Medical Society:

WHEREAS, The eleven senior medical societies in this country did accept the invitation to attend, by representation, the celebration of the seventy-fifth anniversary of the Medical Society of the District of Columbia, on the 16th ultimo, and many of them were present by representatives; therefore, be it

Resolved, That the Medical Society of the District of Columbia, in acknowledgment of such cordiality of good will and fraternal comity on the part of said societies, does hereby direct the proper officers to convey to each of said societies, and to each representative present, its grateful appreciation of the high compliment thereby bestowed, and to give expression to the sincere wish that the fraternity and friendship thereby established may continue without interruption through the years to come.

Very respectfully,

S. C. BUSEY, M. D.,
President.

THOMAS C. SMITH, M. D.,
Corresponding Secretary.

DR. G. P. CONN,
Secretary of the New Hampshire Medical Society, Concord, N. H.

OBITUARIES.

PROF. LYMAN BARTLETT HOW, M. D.

BY PROF. C. P. FROST, HANOVER.

Prof. Lyman B. How died at Hanover, N. H., on the 16th day of September, 1893. He was born in New Bedford, Mass., on the 25th day of February, 1838. He was the son of Rev. Moses and Frances Dearborn How. He graduated from Dartmouth college in the class of 1860 and at once entered upon the study of medicine, attending his first course of lectures in the fall of 1860 at the Dartmouth Medical college. He also attended the course of lectures at Dartmouth in 1861 and 1862, and graduated there October 31, 1862. His preceptors in medicine were Dr. Lyman Bartlett, Dr. A. B. Crosby, and Dr. E. R. Peaslee, at different times in his course of study. He also had a course of medical lectures in New York city in 1861 and 1862. After graduation he went to New York for another year of study, and in June, 1864, he came to the city of Manchester and began the practice of medicine. He was demonstrator of anatomy and assistant to Dr. Peaslee in 1864–'65 at Hanover. In 1866 he gave the lectures in anatomy at Dartmouth in the absence of Dr. Peaslee in Europe. In 1867 and 1868 he was demonstrator of anatomy, and in 1869 he was assistant professor of anatomy, and in that same year was appointed full professor of anatomy and physiology to succeed Dr. Peaslee. He held the chair of anatomy from 1885 until his death, giving his last lecture in 1892 He also gave the course in anatomy at Bowdoin college in 1889, on account of the illness of Professor Gerrish.

He married Mrs. Mary L. Perry Taylor, of Hanover, at New Bedford, Mass., October 10, 1866, who, with three daughters, survives him.

Dr. How was endowed by nature with a bright mind in a very feeble body. His slender physique made it impossible for him to undertake work requiring much strength or large powers of endurance. Yet he accomplished in his quiet way a great deal of hard work. He held a very firm attachment to his friends, and was ever ready to serve them to the full extent of his ability. He had a great love for humor, and his conversation was often enlivened by some bright turn or good story. In the lecture room he would often arouse the interest of the class, when the talk on bones became rather dry, by some story, which he would relate with the most solemn expression of countenance. Thus he would fix the attention of his class, although sometimes the tale may have been remembered after the point he illustrated by it was forgotten. No one ever had just cause for ill-will toward Dr. How. His disposition was most kindly toward all. He bore such burdens as came to him in his life with equanimity and without complaint. In his somewhat prolonged illness he was always cheerful, although he was denied the hope of recovery which so generally sustains the sufferer from phthisis pulmonalis, because he knew so well the true significance of the various phases of his disease as they were developed.

Throughout his whole professional life he was engaged in teaching. He was always connected with Dartmouth Medical college in some capacity, and at Manchester he continued his teaching with private classes of students. Many members of our profession owe much to the aid of Dr. How for acquiring a knowledge of the structure and functions of the human body. He loved to teach, and gave to this work and to preparation for it much interested study and thought. His last course of lectures was given after he had been obliged for several months to forego entirely the practice of his profession, by reason of failure of strength. The love of teaching took him for several weeks from his sick-bed. The presence of the medical class and the familiar surroundings of the lecture room roused all his physical and mental energies. Though greatly exhausted at the close of each lecture, he was really better at the end of the session than at the beginning. Those who have sat under his tuition fully appreciate the charms and clearness of his descriptions, the thoroughness of

his presentations of his topics, and the practical bearings brought out in his lectures. He fully believed in the necessity of a thorough knowledge of anatomy to the medical practitioner as well as to the surgeon. No student could secure his passing mark who did not display a reasonable knowledge of anatomy and physiology.

He greatly loved his professional work. He very early built up a good practice in Manchester. He was a thorough and very careful student of disease, and he was intelligent and skillful in the employment of the means for curing or relieving his patients. He was a good surgeon, and performed many operations which showed a wise use of his education and training. In later years his counsel and assistance were often sought in the towns of the state, near Manchester. He has left a most honorable professional record.

He was always a useful member of our state society, and was for years one of its officers. He was honored by the society with the presidency in our Centennial year, and he gave honor and much credit to the society by his scholarly historical address, which cost him much loving labor in preparation, and which gave to the Fellows much valuable information as to the early members and their work in the society and elsewhere.

In the death of Dr. How his family have sustained the loss of a very kind husband, a fond and indulgent father; the community in which he lived has lost a good physician; the college where he so long labored has lost a valuable teacher; this society has parted with a most useful Fellow; the state has lost an upright citizen, and the world an honest man.

HENRY MINOT FRENCH, M. D.

BY C. R. WALKER, M. D., CONCORD.

Dr. Henry M. French, son of the late Leonard French, M. D., of Manchester, was born in Ashby, Mass., April 1, 1853, and died June 13, 1893.

When eight years of age, he moved with his parents to Manchester, and was educated there in the public schools.

In 1872 he entered Dartmouth college, graduating in 1876.

While in college Dr. French was a great favorite, and his fine bass voice and knowledge of music made him a valuable member of the Handel society and the College Glee Club. He was also a member of the Kappa Kappa Kappa society.

On leaving college he began the study of medicine with his father and brother, Drs. L. and L. M. French, at Manchester.

In 1877 and 1878 he attended the lectures at the Dartmouth Medical school, receiving the degree of M. D. in 1878. He then went to New York, where he pursued a post graduate course in the New York University Medical school, and took special courses with Dr. Loomis in the wards of Bellevue Hospital. In June, 1879, he was appointed assistant physician in Kings County Hospital, Flatbush, L. I., where he remained till April, 1880. During this time he was also studying diseases of the throat with Dr. T. P. French at the Long Island College Hospital. In this specialty he was particularly interested, and his knowledge of the subject gave him later an enviable reputation among his brother practitioners. In the spring of 1880 he made special study of diseases of women, at the Demilt Dispensary in New York city.

Returning to his home he was offered the position of assistant physician at the New Hampshire Asylum for the Insane, which he accepted and held from June 2, 1880, till on November 16, 1880, he opened an office for general practice in Concord, where he resided until unable longer to attend to his professional work, when he returned to his father's home in Manchester, July 17, 1891.

In 1880 he became a member of the New Hampshire Medical Society, and also joined the same year, the Centre District Medical Society. In 1886 he was sent as delegate of the state society to the graduation exercises at the Dartmouth Medical college, and in 1885 read an instructive paper on nasal catarrh, at our annual meeting. He was appointed prison physician by Governor Hale in 1883, and reappointed by Governor Currier, holding the office four years. He was a valued member of the

staff of the Margaret Pillsbury General Hospital from its inception as the Concord Hospital Association, till the time of his death.

As a medical expert, especially in mental diseases, Dr. French had an enviable reputation all over the state, and his relations with the legal fraternity were always those of good fellowship and respect.

Outside of his professional work, Dr. French had made for himself a wide reputation in music, and although this was always subservient to his medical duties, still his fine voice was often heard in concerts and musical meetings. He was particularly happy in his rendering of church music, and was for years a member of some church choir. For three years he was director of music at the Unitarian church, and for two years at the South Congregational church, in Concord.

He was a member of the First Congregational church in Manchester.

Dr. French was prominent in all the social life in Concord but was never married. He left behind him scores of friends, who all bear universal testimony of his great worth. No eulogy other than the above recital of his life-work is needed by our fellow-member.

Stricken down in his prime by cancer of the rectum, he fought his battle for life with unfaltering courage in spite of the certainty of defeat. None but the victim or a medical man knows the torture of this disease—none but a physician can realize to its fullest extent what a world of fortitude and self-control is made known by the testimony of his friends, that in all his terrible sickness no complaint, no murmur of despair, no rebelling against his fate, ever passed Dr. French's lips. We who looked on at times powerless to even alleviate his awful sufferings, can hardly claim to have been so submissive to the inevitable. We mourn his loss, but in the same breath thank God, in whose justice our friend had such infinite faith, that at last that terrible pain is ended.

CHARLES C. PIKE, M. D., PEABODY, MASS.

BY GEORGE COOK, M. D., CONCORD, N. H.

Charles Colby Pike was born in New London, N. H , May 5, 1844, and was the son of James M. and Sarah Colby Pike. His early life was passed upon the farm, in attending the district school, about the same as other boys from the rural districts in our state ; his town, however, having the advantage over some others, in that it had a very excellent higher school, the Colby Academy, at which our friend was a student when the War of the Rebellion came upon the country. Company F, Eleventh New Hampshire Volunteers, was formed mostly from his fellow-townsmen, and young Pike enlisted, being mustered into the service of the United States August 29, 1862. At the Battle of Fredericksburg, Va., December 13, 1862, he was severely wounded and was sent to the hospital, and upon April 18, 1863, he was discharged by reason of disability. Upon his return home, although still suffering from his wound, he again attended Colby Academy, completing his course there, and began the study of medicine in 1865, under the direction of the late Dr. S. M. Whipple of New London. He attended three courses of medical lectures, two at Dartmouth and one at Harvard, and was graduated M. D. from the former institution in 1869. Dr. Pike immediately located in Sutton, N. H., and that year became a member of the New Hampshire Medical Society. He soon built up a large practice in Sutton, and while there married Miss Eveline Piper of Hopkinton, N. H., who died in one year after their marriage, leaving an infant daughter who survived until about six years of age. In 1872, Dr. Pike removed to Peabody, Mass., and in a short time succeeded in establishing a very extensive business. He became a member of the South Essex District and the Massachusetts Medical societies, of which he was a very active member, and was president of the district society in 1885. He was a member of the Grand Army of the Republic, Masonic and Odd Fellows fraternities, and also a member of the Orthodox Congregational church. Under President Harrison, Dr. Pike

was president of the United States pension examining board at Salem, Mass.

In 1874 he married Miss Susan Baker of Peabody, who survives him. He died very suddenly of appendicitis January 27, 1894.

For nearly twenty-two years Dr. Pike had labored in his profession at Peabody, and it was there that his life-work was really done. My long acquaintance and close friendship for him make me a too partial writer, but the universal respect in which he was held by the people of his town was attested by every proper demonstration that could be made in his memory. Dr. Pike was an enthusiast in his profession, believed in it for humanity's sake, and was a faithful physician. He was a man of strong convictions and had the moral courage to act by them. When once convinced that he was right, nothing would hinder his performance of duty. A warm and kindly nature, he was keenly alive to the sorrows and sufferings of the lowest as well as the highest, and his interest was of a positive kind, that not only sought to relieve for the time, but to remove the cause of suffering. As a citizen he did his duty among his fellow-townsmen, and was foremost in everything that tended to elevate and make them better. As an honest, conscientious medical man of more than ordinary ability he included all the elements best expressed by "he was a good physician."

RESOLUTIONS OF THE ESSEX SOUTH DISTRICT MEDICAL SOCIETY.

WHEREAS, Dr. Charles C. Pike, an honored and beloved member of the Essex South District Medical Society, has, in the infinite wisdom of God, been called from among us in the prime of his manhood; therefore, be it

Resolved, That in his death we recognize the great loss to this society, to the community in which he lived, as well as a personal bereavement to those of us who knew and loved him so well; and we desire to pay to his memory a tribute of sincere respect, expressing our admiration of his attainments as a physician and of his manliness and purity of character.

Resolved, That we extend to his wife and family our heartfelt sympathy at the great grief which has come upon them.

Resolved, That a copy of the above be presented to the family of the deceased, and also be entered upon the records of the society.

(Signed) C. A. CARLETON,
CHARLES W. HADDECK,
FRANK L. ATWOOD,
Committee.

ANNUAL MEETING, 1894.

LIST OF THE FELLOWS

OF THE

NEW HAMPSHIRE MEDICAL SOCIETY.

N. B. The Secretary requests members to examine this list closely, and notify him of any corrections to be made, as it is intended to publish the roll of members annually, and it is desirable to make it as accurate as possible. *Members allowing themselves to become three years in arrears for dues will find their names dropped from the roll, as it is construed that they no longer desire to remain connected with the Society.* Members are not entitled to a copy of the Transactions until their dues are paid to the Treasurer. An asterisk (*) indicates a retired member.

Admitted.	Name.	Residence.
1872.	Abbott, A. W.	Laconia.
1894.	Abbott, Clifton S.	Laconia.
1882.	Abbott, Edward	Tilton.
1876.	*Abbott, O. D.	Manchester.
1894.	Achard, H. J.	Manchester.
1894.	Adams, Chancey	Concord.
1873.	Adams, D. S.	Manchester.
1875.	Adams, Ira H.	Derry Depot.
1888.	Aldrich, W. H.	Marlborough.
1886.	Allen, Bradford	Nashua.
1878.	Allen, Carl A.	Holyoke, Mass.
1890.	Allen, C. J.	Peterborough.
1886.	Allen, George E.	Bradford, Mass.
1894.	Annable, Edwin G.	Concord.
1876.	Anthoine, I. G.	Nashua.
1871.	Atkinson, W. P.	Eaton.
1894.	Bartlett, Clarence S.	Concord.
1882.	Bancroft, Charles P.	Concord.
1885.	Bean, J. W.	West Medford, Mass.
1886.	Berry, John J.	Portsmouth.
1886.	Blair, A. W.	Dorchester, Mass.

Admitted.	Name.	Residence.
1878.	Blaisdell, Frank	Goffstown.
1869.	Blaisdell, George C.	Contoocook.
1886.	Blake, Chas. A.	State Farm, Mass.
1885.	Blake, W. P.	Farmington.
1889.	Blaylock, Ella	Nashua.
1894.	Bolster, Augustus S.	Belmont.
1879.	Boutwell, Henry T.	Manchester.
1883.	Boutwell, Henry W.	Manchester.
1889.	Boynton, O. H.	Lisbon.
1888.	Brigham, Frank E.	Salmon Falls.
1865.	Brown, J. Frank	Manchester.
1871.	Brown, J. P.	Taunton, Mass.
1892	Burnett, Frank H.	Hinsdale.
1870.	*Burnham, A. C.	Hillsborough Bridge.
1856.	Burnham, Hosea B.	Manchester.
1894.	Burnham, John L.	Manchester
1884.	Burns, Robert	Plymouth.
1880.	Butler, Jacob N.	Lempster.
1893.	Buzzell, C. P.	Northwood.
1891.	Cain, W. G.	Cambridgeport, Mass.
1856.	Carbee, S. P.	Haverhill.
1892.	Carpenter, Irving L.	Manchester.
1867.	Carr, E. L.	Pittsfield.
1869.	Carter, W. G.	Concord.
1869.	*Carlton, C. A.	Salem, Mass.
1879.	Carvelle, H. D. W.	Manchester.
1874.	†Chase, W. D.	Peterborough.
1891.	Cheney, Jona. M.	Ashland.
1867.	Child, William	New Hampton.
1894.	Cheever, Benjamin	Portsmouth.
1883.	Chesley, A. P.	Concord.
1892.	Clark, Edgar A.	Concord.
1891.	Clough, L. Willard	Bethel, Vt.
1876.	Cogswell, J. R.	Warner.
1892.	Colby, Frank A.	Berlin.
1865.	Conn, G. P.	Concord.
1892.	Cook, Edwin A.	Colebrook.
1869.	Cook, George	Concord.
1891.	Crosby, Dixi	Exeter.
1881.	*Cummings, A. R.	Claremont.
1845.	*Currie, T. H.	Lebanon.
1882.	Currier, E. H.	Manchester.
1873.	Currier, D. M.	Newport.

† Died since last meeting.

Admitted.	Name.	Residence.
1879.	Cutler, John H.	Peterborough.
1873.	Cutter, George I.	West Swanzey.
1878.	Danforth, M. S.	Manchester.
1890.	Davis, George M.	Merrimack.
1890.	Day, Arthur K.	Concord.
1876.	Dearborn, D. S.	Milford.
1854.	*Dearborn, S. G.	Nashua.
1869.	Dinsmoor, S. M.	Keene.
1881.	Dinsmore, W. H.	Nashua.
1878.	Dix, M. C.	Hinsdale.
1878.	Dodge, C. M.	Manchester.
1888.	Dodge, Henry	Webster.
1893.	Downing, C. W.	Manchester.
1883.	Drake, C. B.	West Lebanon.
1894.	Eames, Fred H.	Manchester.
1840.	Eastman, J. C.	Hampstead.
1883.	Eastman, O. D.	Woodsville.
1879.	Emerson, A. L.	Chester.
1880.	Emery, Alfred E.	Penacook.
1889.	Erskine, James B.	Colebrook.
1866.	*Evans, Earl	Winchester.
1878.	Fairbanks, C. A.	Dover.
1890.	Faulkner, H. K.	Keene.
1877.	Felt, M. H.	Hillsborough Bridge.
1883.	Fisher, E. C.	Sunapee.
1883.	Fisher, F. P.	Enfield Centre.
1883.	Flanders, Charles F.	Manchester.
1892.	Ford, Inez H.	Dover.
1868.	Foster, T. S.	Laconia.
1891.	Fox, Isaac N.	North Woodstock.
1885.	French, Edward	Concord.
1875.	French, L. M.	Manchester.
1893.	Frink, Lewis J.	Bartlett.
1893.	Fritz, Emdon	Manchester.
1872.	Frost, Carlton P.	Hanover.
1893.	Frost, Gilman D.	Hanover.
1839.	†Gage, Charles P.	Concord.
1887.	Garland, William R.	Campton Village.
1882.	George, Charles F.	Goffstown.
1881.	Gibson, Charles R.	Woodsville.
1865.	Goodhue, D. P.	Springfield.
1853.	*Goss, Oliver	Lakeport.

† Died since last meeting.

Admitted.	Name.	Residence.
1886.	Goss, O. W.	Lakeport.
1885.	Gould, Chas. R.	Tilton.
1855.	Gould, True M.	Raymond.
1883.	Gove, George S.	Whitefield.
1883.	Grant, L. E.	Somersworth.
1869.	Graves, E. E.	Boscawen.
1869.	*Graves, F. W.	Woburn, Mass.
1890.	Gray, George H.	Lynn, Mass.
1893.	Greeley, Guy H	Hillsboro Bridge.
1893.	Greeley, James T.	Nashua.
1894.	Grimes, Warren P.	Northwood.
1887.	Gross, Chas. W.	Milton.
1892.	Guptil, George R.	Raymond.
1869.	Ham, J. R.	Dover.
1882.	Hammond, C. B.	Nashua.
1863.	Hanson, C. W.	Northwood Ridge.
1887.	Harmon, M. A.	Ossipee.
1888.	Harriman, A. H.	Laconia.
1880.	Hatch, G. W.	East Wilton.
1888.	Hawkins, F. D.	Meredith.
1887.	Hayes, John A.	Somersworth.
1893.	Heffenger, Arthur C.	Portsmouth.
1894.	Hill, Edmund E.	Suncook.
1839.	Hill, L. G.	Dover.
1890.	Hill, Roscoe	Epsom.
1886.	Hiland, Thomas	Concord.
1892.	Hodgdon, E. P.	Lakeport.
1888.	Hodsdon, E. W.	Centre Sandwich.
1882.	Hoitt, Geo. C.	Manchester.
1872.	Holbrook, Guy	Lowell, Mass.
1885.	Holbrook, Henry C	Penacook.
1888.	Holcombe, C. H	Brookline.
1886.	Houghton, E. F.	Claremont.
1891.	Hoyt, Jane E.	Concord.
1889.	Humiston, F. G.	East Jaffrey.
1882.	Hutchinson, H. S.	Milford.
1890.	Hyland, Jesse B.	Keene.
1892.	Ingalls, George H.	Belmont.
1881.	Jackson, Joseph A.	Manchester.
1884.	Jarvis, Leonard	Claremont.
1876.	Jones, D. W.	Tacoma Park, D. C.
1883.	Jones, F. P.	Mill Village.
1887.	Jones, Fred W.	New Ipswich.
1884.	Junkins, William O.	Portsmouth.

Admitted.	Name.	Residence.
1891.	Kean, M. E.	Manchester.
1867.	*Kelley, C. K.	Plymouth.
1886.	Kimball, George M.	Concord.
1860.	*Kingsbury, C. F.	West Medford, Mass.
1890.	Kittredge, Frank E.	Nashua.
1893.	Lake, E. E.	Hampstead.
1891.	Lamb, Zenas	Enfield.
1892.	Lamson, Charles A.	Scytheville.
1882.	Lanouette, Joseph E. A.	Manchester.
1869.	Larabee, G. H.	Suncook.
1876.	Lathrop, M. C.	Dover.
1889.	Leith, Wm. H.	Lancaster.
1885.	Lemaitre, Joseph E.	Manchester.
1884.	Leet, George E.	Concord.
1891.	Leet, Jas. A.	Enfield.
1885.	Leonard, William S.	Hinsdale.
1887.	Lougee, George W.	Freedom.
1892.	Lovejoy, Chas. W.	Concord.
1891.	Lyons, Wm. H. A.	Manchester.
1854.	*Manahan, Val	Enfield.
1890.	Marston, Enoch Q.	Sandwich.
1894.	Matthews, W. C.	Walpole.
1888.	McGregor, G. W.	Littleton.
1892.	McGregor, J. L.	Whitefield.
1892.	McMurphy, Nelson W.	Concord.
1868.	McQuesten, E. F.	Nashua.
1887.	Megrath, Wm. A.	Loudon.
1888.	Merrill, J. F.	Franklin Falls.
1892.	Mitchell, Abram W.	Epping.
1882.	Mitchell, Ezra, Jr.	Lancaster.
1881.	Moffett, Frank T.	Littleton.
1893.	Moran, B. G.	Nashua.
1891.	Morey, G. B.	Manchester.
1892.	Morgan, George P.	Dover.
1882.	Morse, Charles A.	Newmarket.
1893.	Morrill, Leonard B.	Centre Harbor.
1880.	Morrill, S. C.	Concord.
1883.	Munsey, G. F.	Suncook.
1893.	Nason, Arthur C.	Newburyport, Mass.
1880.	*Nelson, D. B.	Laconia.
1887.	Newell, Henry E.	Derry Depot.
1873.	Nichols, C. B.	Sacramento, Cal.

Admitted.	Name.	Residence.
1883.	O'Brien, C. C.	Groveton.
1868.	Odell, J. W.	Greenland.
1888.	Osgood, George E.	East Barrington.
1881.	Otis, E. O.	Exeter.
1874.	Palmer, Haven	Plymouth.
1885.	Parker, H. R.	Dover.
1868.	Parsons, John W.	Portsmouth.
1856.	*Pattee, Luther	Manchester.
1880.	Pattee, W. H.	Manchester.
1850.	*Peabody, L. W.	Henniker.
1879.	Perkins, F. B.	Londonderry.
1889.	Petit, A. Wilfred	Nashua.
1884.	Pettengill, James B.	Amherst.
1893.	Pick, Albert	Boston.
1891.	Pickard, Daniel	Franklin Falls.
1893.	Pitman, Arthur J.	Auburn.
1880.	Pray, J. W.	East Northwood.
1889.	Prichard, Kate E.	Nashua.
1883.	Prouty, Ira J.	Keene.
1894.	Quackenbos, John D.	New London.
1889.	Quimby, John Grant	Lakeport.
1891.	Rawson, Geo. W.	Amherst, Mass.
1886.	Raynes, J. B.	Lebanon.
1894.	Reed, Elizabeth B.	Keene.
1877.	Richardson, A. P.	Walpole.
1890.	Richmond, Allen P.	Dover.
1857.	Roberts, S. W.	Wakefield.
1851.	*Robinson, A. H.	Concord.
1887.	Robinson, John F.	Manchester.
1879.	Robinson, J. L.	Manchester.
1894.	Rowe, Frank H.	Bedford.
1878.	Russell, J. Wallace	Concord.
1869.	Russell, M. W.	Concord.
1888.	Saltmarsh, Geo. H.	Lakeport.
1884.	*Sanborn, C. A.	Redlands, Cal.
1880.	Sanborn, G. H.	Henniker.
1858.	Sanborn, J. H.	Franklin Falls.
1881.	†Sanborn, T. B.	Newport.
1887.	Scott, N. H.	Wolfeborough.
1890.	Shea, A. W.	Nashua.
1888.	Smith, A. Noel	Dover.

† Died since last meeting.

Admitted.	Name.	Residence.
1893.	Smith, Frank A.	Lebanon.
1888.	Smith, Henry O.	Hudson.
1870.	*Smith, J. Ranlet	Gloucester, Mass.
1879.	Smith, W. T.	Hanover.
1888.	Spaulding, F. W.	Clifton Springs, N. Y.
1892.	Stackpole, H. H.	Dover.
1844.	*Stackpole, P. A.	Dover.
1882.	Staples, J. W.	Franklin Falls.
1892.	Starr, Cornelius F.	Manchester.
1891.	Steel, Minot A.	Hampstead.
1875.	Stillings, F. A.	Concord.
1894.	St. Hilaire, Emilé	Concord.
1890.	Stokes, D. L.	Rochester.
1880.	Stone, M. T.	Troy.
1891.	Straw, Amos G.	Manchester.
1892.	Straw, Zatae Longsdorff	Manchester.
1876.	Sturtevant, C. B.	Manchester.
1891.	Sullivan, D. E.	Concord.
1891.	Swazey, Chas. E.	Somersworth.
1892.	Sweeney, Henry L.	Kingston.
1894.	Swett, Eddy B.	Goffstown Centre.
1841.	*Swett, J. L.	Newport.
1886.	Taft, A. H.	Winchester.
1893.	Thurber, M. T.	Grafton.
1877.	Tolles, C. W.	Claremont.
1890.	Towle, G. H.	Deerfield.
1878.	Towne, G. D.	Manchester.
1874.	Tucker, E. M.	Canaan.
1890.	Tufts, Chas. A.	Dover.
1891.	Tuttle, Karl A.	Roxbury, Mass.
1844.	*Twitchell, G. B.	Keene.
1888.	Vittum, Stephen	Laconia.
1880.	Wade, E. A.	Salem Depot.
1887.	Wadleigh, W. K.	Hopkinton.
1878.	Walker, C. R.	Concord.
1893.	Wallace, Alonzo S.	Nashua.
1886.	Wallace, Ellen A.	Manchester.
1879.	Watson, I. A.	Concord.
1860.	*Waterhouse, William	Barrington.
1887.	Way, Osman B.	Claremont.
1883.	Weaver, C. A.	New Boston.
1882.	Weymouth, G. W.	Lyme.
1845.	*Weymouth, H. A.	Andover.

Admitted.	Name.	Residence.
1877.	Welch, S. N.	Sutton.
1894.	Wheat, Arthur F.	Manchester.
1858.	*Wheat, Thomas	Manchester.
1893.	Wheet, Fred E.	Plover, Wis.
1853.	Wheeler, John	Pittsfield.
1890.	Willey, Bertram E.	E. Weymouth, Mass.
1878.	*Wilson, J. W.	Contoocook.
1889.	Woodman, M. S.	West Lebanon.
1883.	Woodward, J. N.	Nashua.
1879.	Young, Leander J.	Haverhill, Mass.

CONTENTS.